April 14, 1947

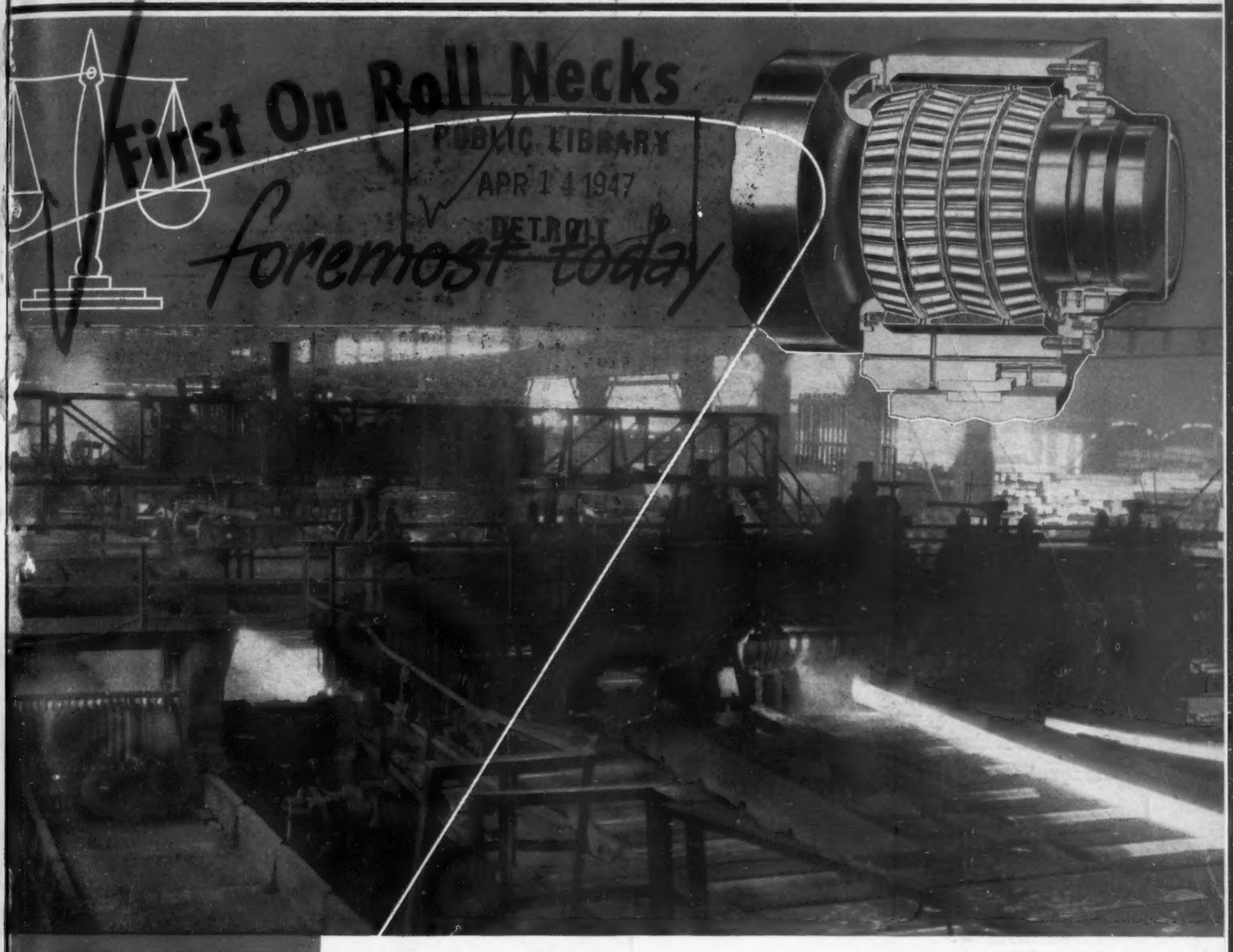
STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 51

PUBLIC LIBRARY
APR 14 1947
DETROIT



The Proving Ground of Timken Roll Neck Bearings.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROLL NECK BEARINGS

Timken Roller Bearings were first applied to mill roll necks more than 20 years ago and, logically, the proving ground of Timken Roll Neck Bearings was The Timken Roller Bearing Company's own steel plant.

Here the pioneer bearings received their initial testing; here, in conjunction with a constant program of engineering and metallurgical research they were developed from the experimental stage to practical, dependable products that could be offered to the steel industry as a sure means of increasing production and reducing costs on rolling mills of all types — hot and cold.

Throughout the many years of development of Timken steel mill bearings, we constantly have anticipated new rolling mill trends and requirements. Thus, some time ago, it became evident that far greater strength and rigidity would be demanded in the rolling mills of the future. We therefore set to work to develop a roll neck bearing which, while possessing all the characteristic advantages of existing roller bearings, would permit the use of larger diameter roll necks and thus greatly reduce roll neck stresses and deflection.

The result was the Timken Balanced Proportion Bearing destined to have far-reaching and revolutionary effects, not only on mill roll necks, but wherever anti-friction bearings are used. The Timken Roller Bearing Company, Canton 6, Ohio.

The EC&M Type SW All Welded LIFTING MAGNET

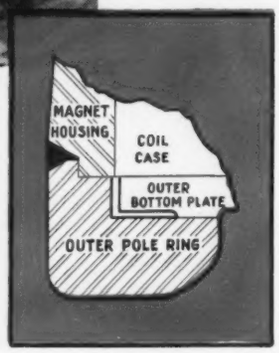
Furnishes Its Own Proof

"This extremely large lift was made under normal conditions," reports H. K. Hardcastle of our Philadelphia office.

Yields Big Lifts of Scrap and Pig Iron because--

1. Elimination of pole-shoe bolt-recesses permits a better proportion of coil-space inside the magnet-housing and a more effective magnetic path.

2. Pole shoes are affixed by welding to the magnet-housing. No bolts to stretch and allow an air-gap in which rust, dirt or foreign material can collect and prevent a snug refit. No cored holes in pole shoes—instead, solid rings of metal mated tightly and permanently to the machined surfaces of the magnet-housing.

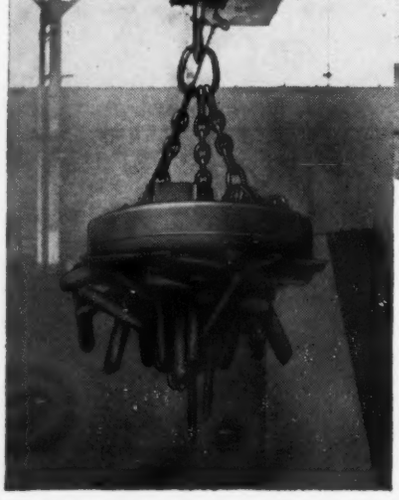


● Users are saying, *"Best circular lifting magnet in the field."* This advanced design using all-welded construction, provides maximum lifting ability over the entire working-surface or bottom of the magnet.

Note, in the illustrations above and at right, that the face or underside of the magnet is completely filled with material to the extreme edges around the outer circumference.

Also observe that these magnets have smooth sides and top—nothing to catch on the side of a railroad car—no dirt-catching pockets on top.

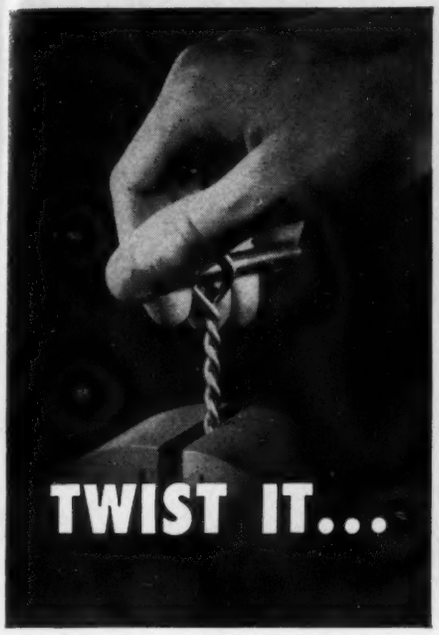
For *fast-handling* of material in scrap yards, iron and steel plants, etc., Type SW *All-Welded* Magnets are available in several sizes. Bulletin 900 gives complete details. Write for a copy.



Headquarters of the All-Welded Lifting Magnet

THE ELECTRIC CONTROLLER & MANUFACTURING CO.

2498 E. 79th St. Cleveland 4, Ohio



YES, EVEN DRAW IT AND THE *Zinc coating stays put*

You're right! That's not ordinary wire—it's bethanized wire. That pure zinc coating, deposited evenly by an advanced electrolytic process, is perfectly bonded to the steel. Give this unique wire any torture treatment you wish, and you won't find any flaking or peeling of that ductile zinc coating.

Naturally, it's highly resistant to corrosion. The protective coating is so pure, so uniform, that rust is locked out at every point on the surface. And whenever extra protection against corrosion is required, bethanized coatings can be supplied in weights up to three times as heavy as those called for in conventional Type 3 galvanizing.

Does bethanized's double feature of Ductility and Corrosion-Resistance sound too good to be true? Test it! Pick a tough job, and give bethanized wire a tryout. We've said many times that it's good—but not nearly so often as those who use it.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

This is a close-up view of the electrolytic cell through which the wire travels. Virgin zinc is electrolyzed from the highly purified bethanizing solution and deposited on the wire surface, perfectly bonded to the steel.

★ Bethanized Wire ★

BETHLEHEM STEEL

① Closing end fin.

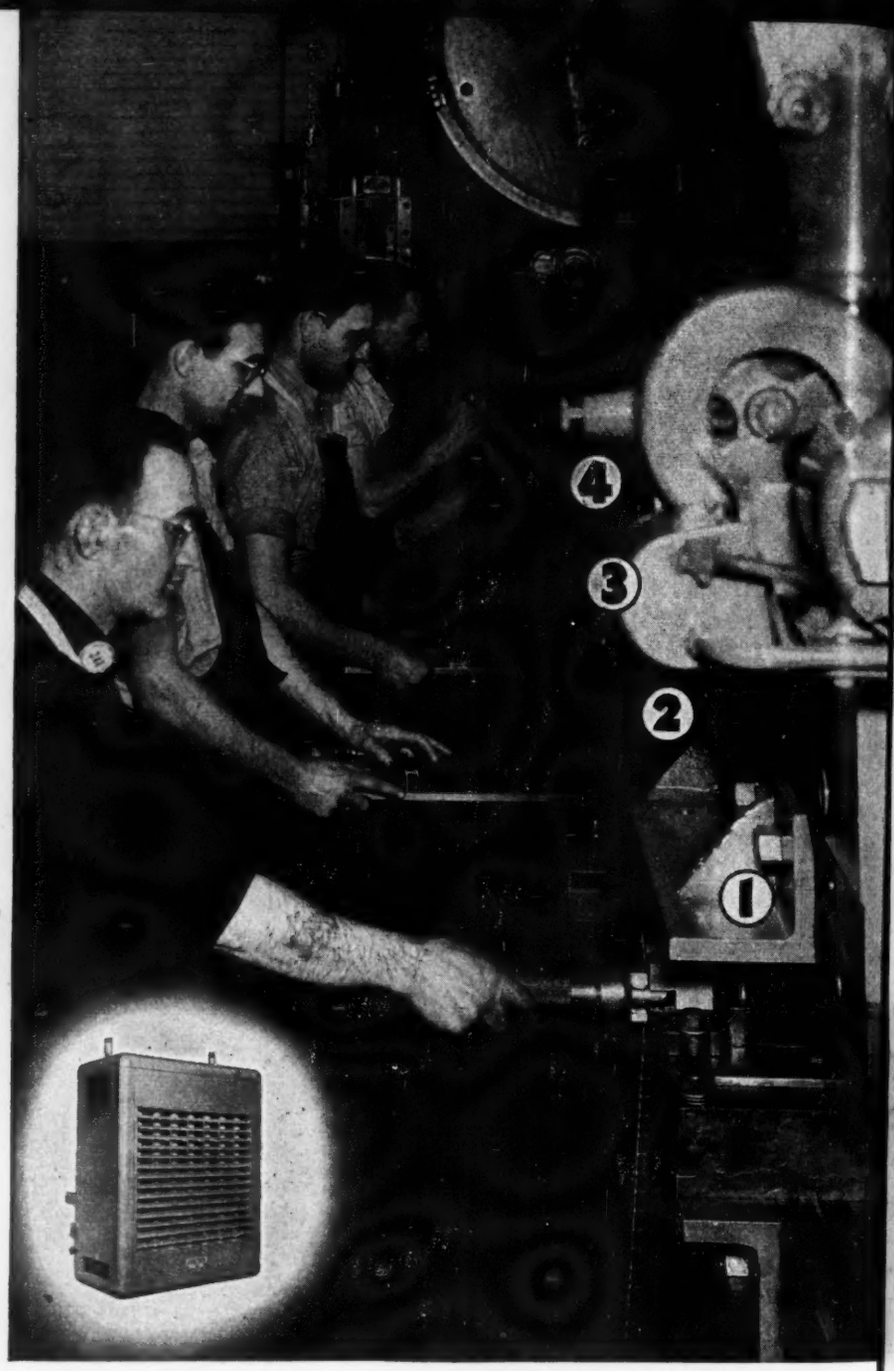
② Trimming and notching corners.

③ Piercing and forming Prestoles.

④ Forming end flange.

Four Operations

ONE STROKE



Courtesy of Surface Combustion Corporation, makers of Janitrol Unit Heaters.

Progressive operations on Cincinnati Press Brakes reduce time and cut costs. They are one type of the almost endless applications of these machines.

Here we show a typical example of the profitable application of progressive, simultaneous operations. Four operations are completed on the first stroke; three on the second.

We suggest you write our Engineering Department about your individual forming problems, or call our representative near you for advice and suggestions.

Write for Catalog B-2.

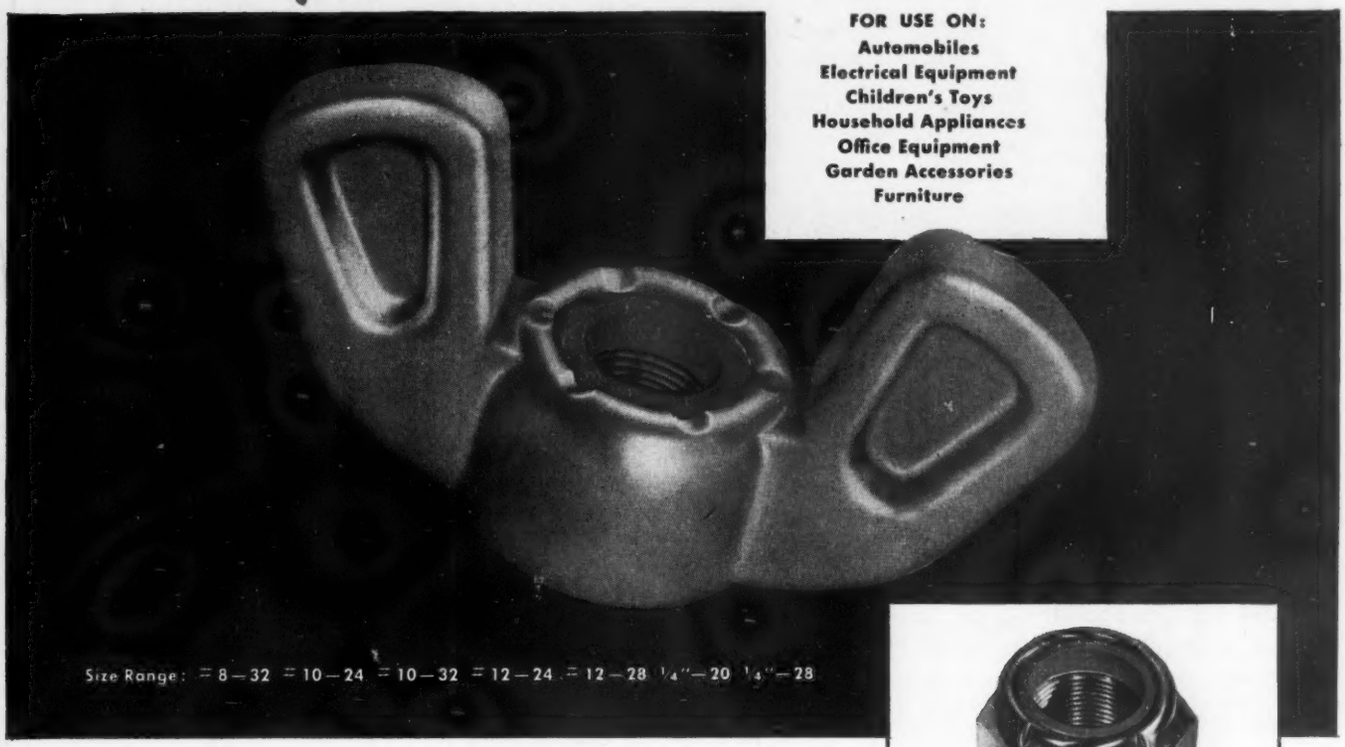
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

NEW! *Self-Locking Wing Nuts*

FOR DETACHABLE OR ADJUSTABLE ASSEMBLIES



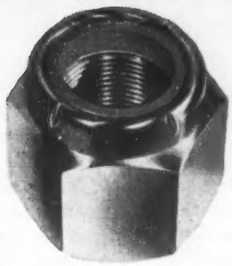
FOR USE ON:
Automobiles
Electrical Equipment
Children's Toys
Household Appliances
Office Equipment
Garden Accessories
Furniture

—with a Nylon Red Elastic Collar that provides dependable REUSABILITY!

Self-locking wing nuts fulfill a long-standing need. Many detachable or adjustable assemblies require the convenience of a wing nut. Yet, such assemblies have always suffered from the inability of ordinary wing nuts to stay tight. ESNA has provided the answer to this problem with a self-locking, self-sealing Wing Nut with a reusable Nylon Red Elastic Collar.

The new ESNA Wing Nuts—like all Elastic Stop Nuts—remain self-locking against Vibration, Impact and Stress Reversal in both fully seated and positioned settings. Yet, they are readily removed by hand. They do not deform the bolt, damage the threads or gall the finish.

Many opportunities exist to improve finished products and to increase their serviceability through the use of ESNA Wing Nuts. They will eliminate all wear now caused by loosened fasteners . . . permit accurate final adjustments, easy removal for quick replacements and product redesign for faster assembly. Leading industrial distributors are stocked and ready to serve you. For further information address: Elastic Stop Nut Corp. of America, Union, N. J. Sales Engineers and Distributors are located in principal cities.



LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY

It is threadless and dependably elastic. Every bolt—*regardless of commercial tolerances*—impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads—and eliminates all axial play between the bolt and nut.

All ESNA Elastic Stop Nuts—*regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

ELASTIC STOP NUTS

INTERNAL WRENCHING

ANCHOR

WING

SPLINE

CLINCH

GANG CHANNEL

CAP

PRODUCTS OF: **ELASTIC STOP NUT CORPORATION OF AMERICA**

Behind the Scenes...

Sales Talk Via Air

Well, it had to come sometime, in this age of radio and radar. Perhaps it's a sign of the increasing competition in the machine tool field, but at any rate our Chicago keyhole expert and homburg-wearer extraordinary, L. C. "Polly" Pelott reports that a machine tool builder in his territory has equipped all officials and salesmen with two-way radio in their cars. Now, as they spin across the prairie in search of new orders, the salesmen can hear all about new and hot prospects enroute, change directions and be on the spot before the unsuspecting customer has had time to change his mind or even call in the competition. We imagine some customer is going to be surprised one of these days when he calls this outfit and finds a salesman camping in his waiting room within a few minutes—and the old salesman's phrase about "just happened to be passing by" is going to take on a new meaning.

No Use for Used Stuff

A lot of releases come to the attention of our editors, material which in many cases is important news about new stuff & things, and which you readers ought to know about. When they contain good stuff, the editors print it, with much to-do. The other day, however, one of the best stories ever came in, and the editors positively refuse to use it. From Air Reduction Co., too, whose technical men know what they're talking about. Trouble with it was that we already used it—the whole thing was a reprint of an earlier article in STEEL, and one of the hardest things to do in this world is to persuade an editor to print something which he has already used. They don't seem to like the idea, somehow.

Puzzle Corner

As we suspected, there are several readers of this colyume who are thoroughly at home when it comes to equatorial railroad problems. At least, they seem to know how to locate the answers to King Shamed's problem, which turned out to be 799.3 inches the track would have to be raised to make it perfectly straight. There were some who managed to get themselves fooled by the extremely small angles involved, but Bert Harvey of Rockford Screw Products came rolling in with the correct answer the same day it appeared. We might add here that Brother Harvey has been in with the correct answer on earlier problems in this series, always running the other boys a good race. This week we are going to propound an interesting little number which we read in the *Postage Stamp*. It smacks of the coconut problem, somewhat, and with a slight bow toward our mathematically inclined brothers, we quote: "Many years ago a merchant was traversing a lonely road to the village, bearing on his noggin a basket of grapes. Before leaving his Humble hut, he Had tasted the bouquet of the Wine produced by some Of his grapes of the first water, and he was somewhat Tipsy. So it came to pass that A tree staggered toward him, bumped him and scattered the grapes helter Skelter. He spake an oath as no oath has been spaken either before or since. And commenced to recover The grapes two at a time. When he Was finished, he found a grape left over. Feeling that perhaps his System was wrong, and being interested in the matter, he again Dumped the grapes and picked them up by threes. Again the Dastardly single grape remained. By fours and fives, by sixes he tried. Each time the Wicked grape remained grinningly unpicked. Waxing angry, he vowed a Mighty vow, that after he picked up the grapes by Sevens, he would tear that last grape to Tatters. But lo, this time nary a grape remained. Whereupon he became stark raving mad, removed his sandals and squashed Every grape with his nose. The question remains. How many grapes Did he squash?"

It's Here Again

Out in Lake Erie we see that most of the ice is disappearing. The freighters are again plowing up and down outside our windows, and the sun shines brightly on the winter's accumulation of dust and dirt. The little park across the street shows signs of turning green, and one of the latest replies we received to the problem of reeling up that thousand feet of steel strip was from a New England structural steel man who said the problem is a common one up there, used for figuring how big a reel they should use to pull in some of those big & powerful finny beauties lurking in the waters 'round the State o' Maine. Yes, sir. Time to start stretching the legs, looking over the garden tools, and cleaning out the paint brushes.

Shrdlu

(Editorial Index—page 51)

STEEL
Vol. 120—No. 15 April 14, 1947

BUSINESS STAFF

GEORGE O. HAYS
Business Manager

ADVERTISING

R. C. JAENKE
Advertising Manager

C. H. BAILEY
Service Manager

A. V. ANDERSON
Production Manager

New York:
E. W. KREUTZBERG, K. A. ZOLLNER
Pittsburgh:
S. H. JASPER, B. C. SNELL
Chicago:
L. C. PELOTT, V. G. BRETTMAN
Cleveland:
D. C. KIEFER, H. G. ROWLAND
Los Angeles:
F. J. FULLER

•

CIRCULATION AND MARKET RESEARCH

J. W. ZUBER
Director
R. L. HARTFORD
Research Manager
H. E. METZNER
Circulation
R. C. RICE
Readers' Service
G. R. EBERSOLE
Mail & List Service

Field Representatives:
JACK BLAKE
H. R. DUNNE
D. G. HEWITT
CLIFFORD PETTIGREW
C. A. PRICE

•

MAIN OFFICE

Penton Building, Cleveland 13, Ohio

BRANCH OFFICES

New York 17.....16 East 43rd St.
Chicago 11.....520 North Michigan Ave.
Pittsburgh 19.....2800 Koppers Bldg.
Detroit 2.....6560 Cass Ave.
Washington 4...956 National Press Bldg.
Los Angeles 4 130 N. New Hampshire Ave.
London: 2 Caxton St., Westminster, S.W. 1

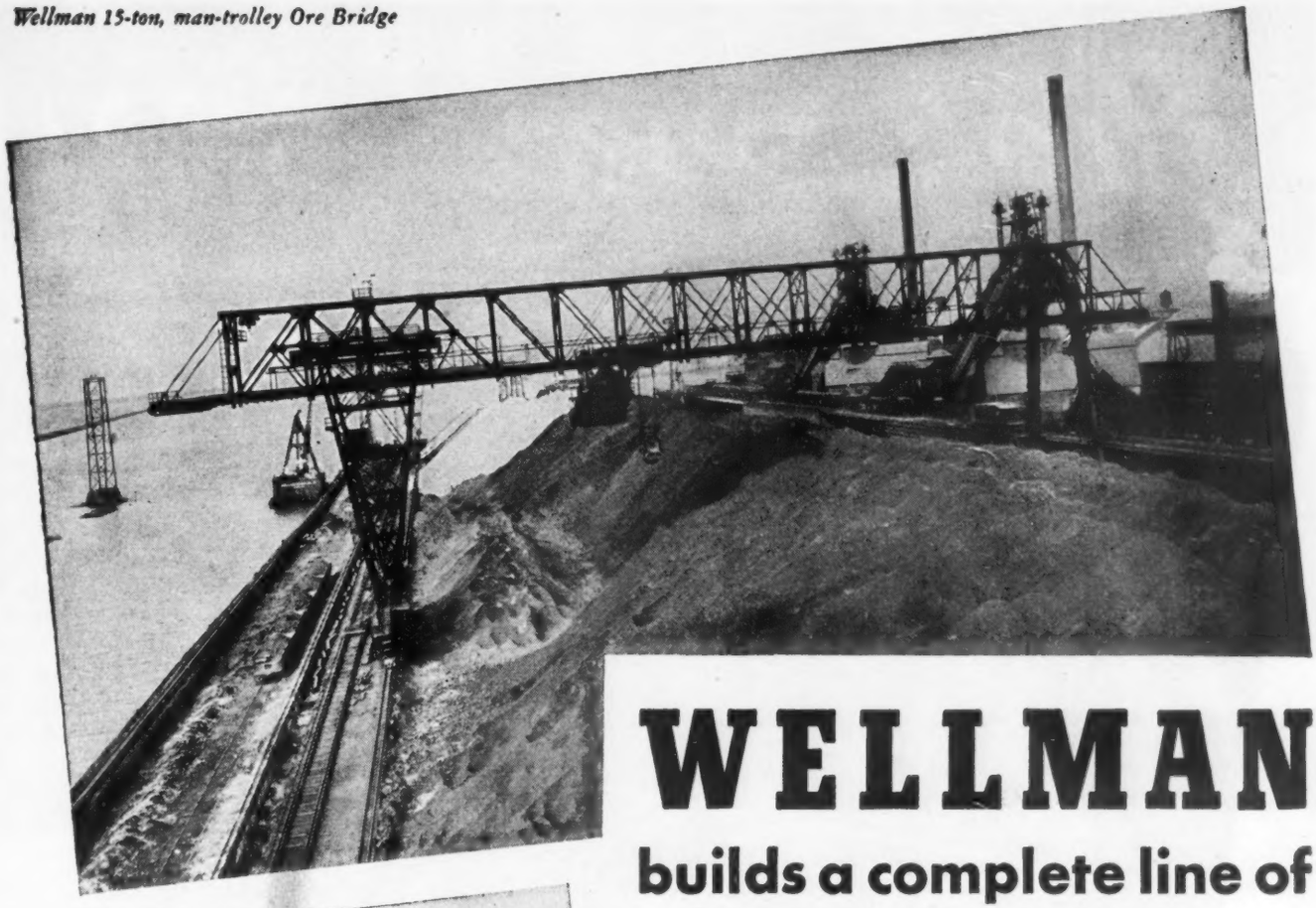
• • •

Published by THE PENTON PUBLISHING Co., Penton Building, Cleveland 13, Ohio, E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President and General Manager; R. C. JAENKE, Vice President; F. G. STEINBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1947 by the Penton Publishing Co.

Editorial Staff on Contents Page

Wellman 15-ton, man-trolley Ore Bridge

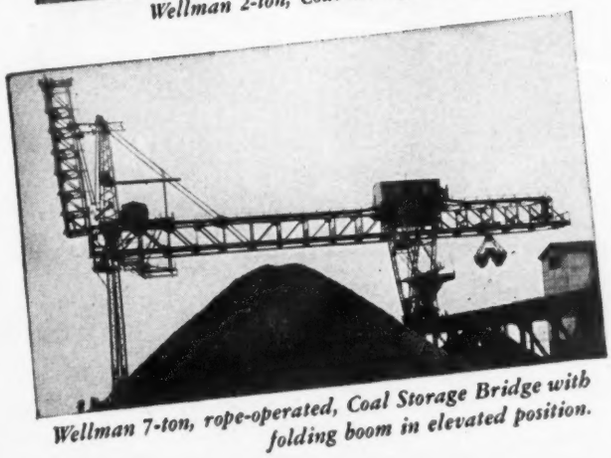


WELLMAN

builds a complete line of ORE and COAL HANDLING BRIDGES

Wellman 2-ton, Coal Storage Bridge

The Wellman Engineering Company has a wealth of experience in building Ore and Coal Handling Bridges of many types and capacities.



Wellman 7-ton, rope-operated, Coal Storage Bridge with folding boom in elevated position.

★

WELLMAN WILL BUILD IT!

- Car Dumpers (all types)
- Ore and Coal Handling Bridges
- Gas Producers
- Skip Hoists
- Industrial Furnaces
- Coke Pushers
- Mine Hoists
- Charging Machines
- Soaking Pits

Special Cranes (Wharf, Dry-Dock, Hammerhead, Pontoon)

THE WELLMAN ENGINEERING COMPANY
7029 CENTRAL AVENUE • CLEVELAND 4, OHIO

High Speed SMALL

T-4134
A distributing ladle receives molten metal from the teapot mixing ladle.

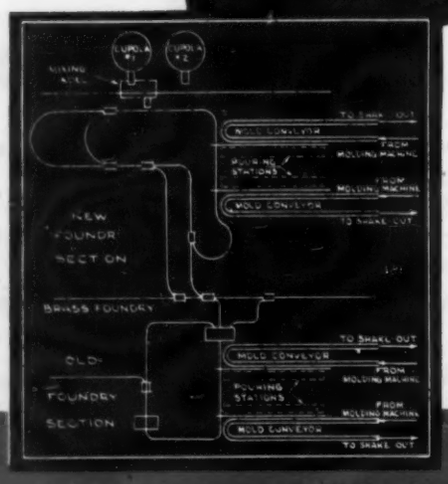
Every Foundry of Every Type and Size Can Profit with CLEVELAND TRAMRAIL

Hundreds of foundries from the smallest to the largest are now enjoying the many advantages that Cleveland Tramrail provides.

Regardless of your problem, if it's handling materials, Cleveland Tramrail can help you. And even if you do not have a problem, you should get the facts on what Cleveland Tramrail can do for you and plan now for the future.

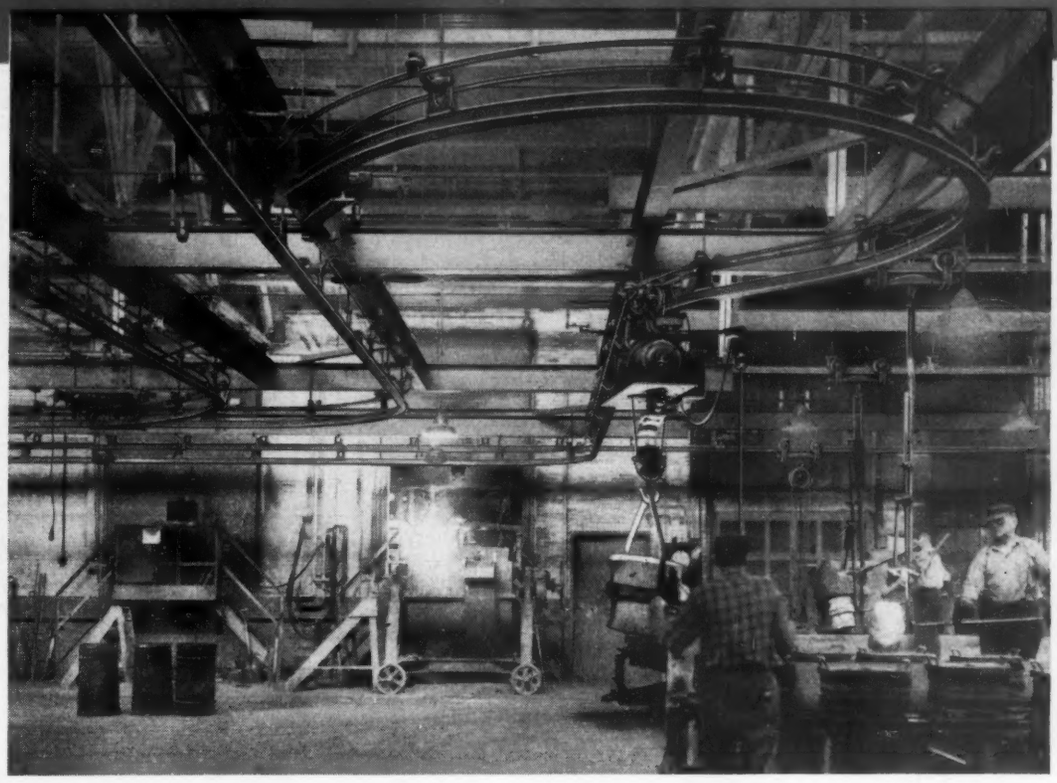
T-4135
The distributing ladle is transported to one of the mold conveyors where the metal is transferred to a pouring ladle. Note both of these ladles ride on hand-propelled overhead Cleveland Tramrail carriers. An electric hoist raises and lowers the distributing ladle. A lever arrangement changes the elevation of the pouring ladle.

T-4136
The molds are poured on the mold conveyor as they pass this station. Although pouring continues all day long at a rapid rate, there is no running helter-skelter or inefficient steps, because molds and metal are brought together here by efficient conveying methods.



Layout of Cleveland Tramrail System

L CASTING PRODUCTION



T-4132
View of overhead rail system serving the two mold conveyors in new foundry section. This is only a part of the extensive Cleveland Tramrail system in this modern foundry

For Tops in Production, Study This Clean, Orderly, Efficient Layout

For the production of small and medium castings, a combination of Cleveland Tramrail equipment and continuous mold conveyors is providing outstanding advantages for an Eastern foundry. Top efficiency is obtained and confusion and lost time reduced to a minimum.

There are four continuous mold conveyors which travel through the molding departments where the molds are received directly from the molding machines. Each conveyor has one man whose sole task is to pour the molds. A second man shifts the weights.

40 tons of grey iron are poured per 9-hour day. The metal is conveyed from the furnace to the pouring stations by the overhead Cleveland Tramrail system. One distributing ladle with operator is required to supply each mold conveyor where the metal is transferred to the small pouring ladles which also ride on tramrail carriers.

This is a high speed production foundry. It is clean and orderly and every detail systematized. Each man has a specific job. Because of the modern facilities provided he handles his work with ease and dispatch. His every step has been carefully planned for maximum efficiency and he cannot deviate from the routine established.

The mold conveyors set the production pace. This is slow enough so that the pourer can fill all molds and have sufficient time to refill his ladle. If for any reason the conveyor is moving too fast, it can be stopped temporarily.

Cleveland Tramrail equipment was originally installed in 1928 to serve the first two continuous mold conveyors put into operation. Because of its satisfactory performance Cleveland Tramrail was again chosen to serve two additional conveyors when installed in 1941.

CLEVELAND TRAMRAIL

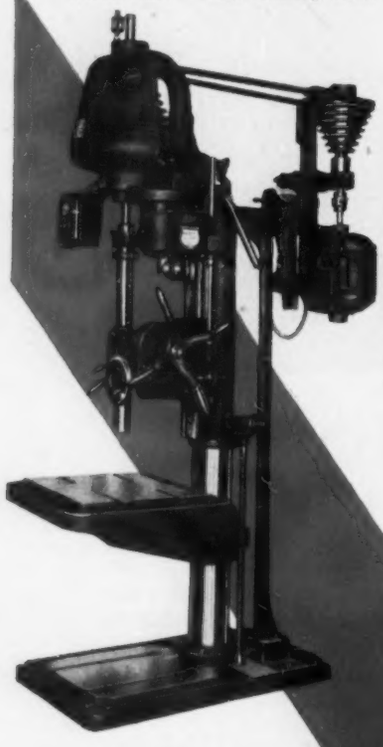
DIVISION OF

THE CLEVELAND CRANE & ENGINEERING CO.

7803 East 286th St. WICKLIFFE, OHIO.

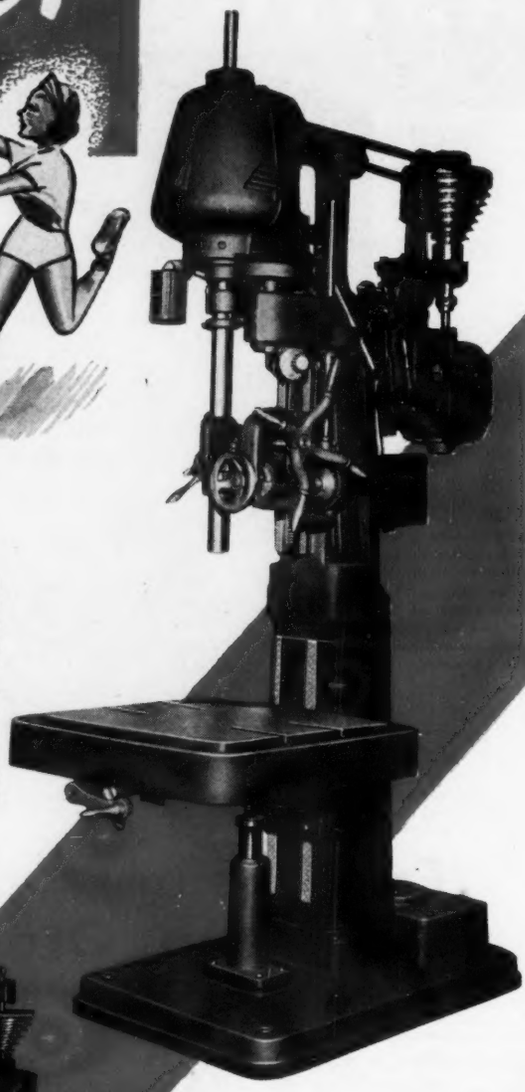
Built Right!

Like an athlete, a **CANEDY-OTTO** Drill press is stripped for fast, precision performance — no gadgets, no superfluous and costly attachments. Our 53 years experience as specialists in drill press design assure you that each unit is **BUILT RIGHT** — an advanced design, quality built for low-cost, accurate, high speed production. Fill all your drill press requirements from the World's Most Complete Drill Press Line — the Canedy-Otto line.



21" BOX COLUMN FLOOR DRILL

1½" capacity, available in one through six spindle models, of full ball and Timken roller bearing design. High alloy steel, heat treated spindle, with positive geared motor and automatic stop for predetermined depth drilling. Also operates through lever power feed or worm wheel feed. Eight step Vee belt drive on tilting motor bracket gives sixteen spindle speeds. Table, column and base of semi-steel casting, finished and normalized.



21" SLIDING HEAD FLOOR DRILL

1½" Capacity, 16-32 speed, single spindle model. Solid one-piece semi-steel cast frame with machined and integrally cast ways for movement of sliding head and table. Full floating spindle pulley. Spindle of heat-treated, high alloy steel, multi-splined. Available with Vee belt drive, back gear and power feed. Entire motor assembly mounted on famous C-O tilting bracket.

16" NO. 5-10,000 B.V. BENCH DRILL

A six speed, super-sensitive, high speed drill press available in 5/16"-3/8" capacity — floor or bench models — with one through six spindles. Ball bearing mounted, full floating spindle. Semi-steel cast column, frame, table and base. Motor unit mounted in famous C-O tilting bracket.

C THE WORLD OVER O

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

Canedy-Otto Mfg. Company
Chicago Heights, Illinois

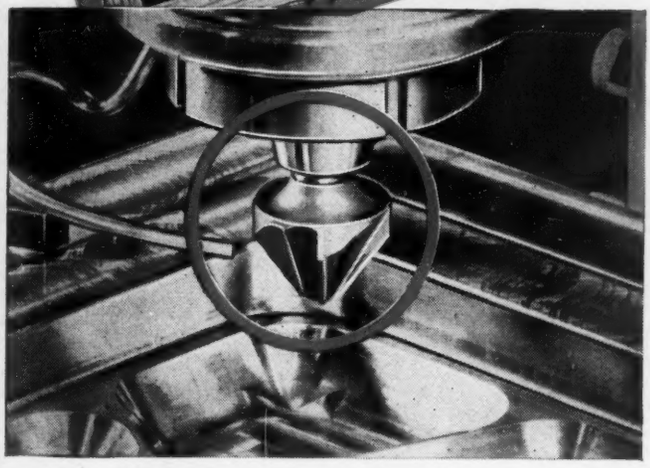
Please send illustrated catalog No. 90S.

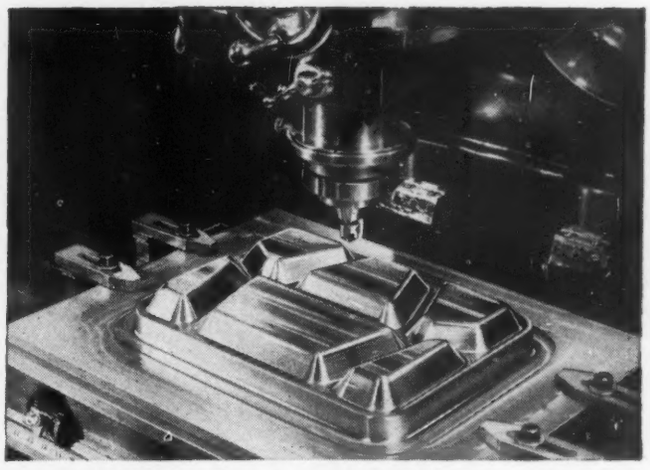
NAME .....

FIRM .....

ADDRESS .....

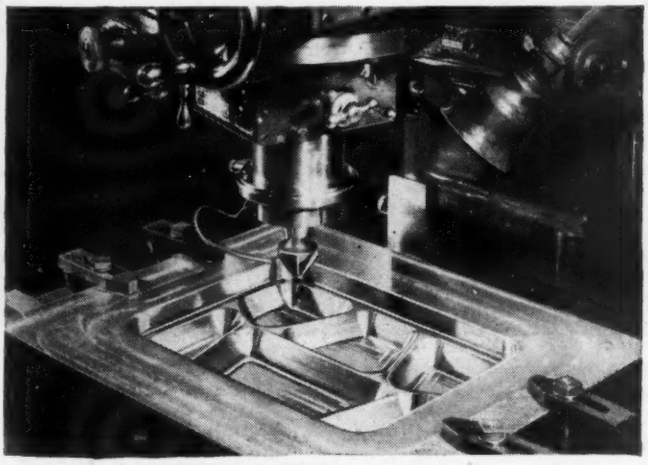
How One Machine Scribed and Machined this Complex Mold— and Made its Own Cutters!





1 **FAST!** The job, a plastic serving tray, required special angles and radii in its cavities. The Model 2D Rotary Head milling machine — a Kearney & Trecker development — completely milled the 3 special form cutters to correct size and shape, including relief and chip clearances.

2 **DIRECT!** The operator accurately located the mold blocks in relation to the Rotary Head center. All layout work, rough and finish milling then were completed with one clamping of the workpiece. No models or templets were required. The blueprint was the only guide necessary.



3 **ACCURATE!** Completing the work in a single setup greatly reduced the chance for error. Precision measuring devices and complete control of all combinations of cutter movements, both angular and radial, made this a simple job of geometric construction for the operator.

4 For more facts of how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

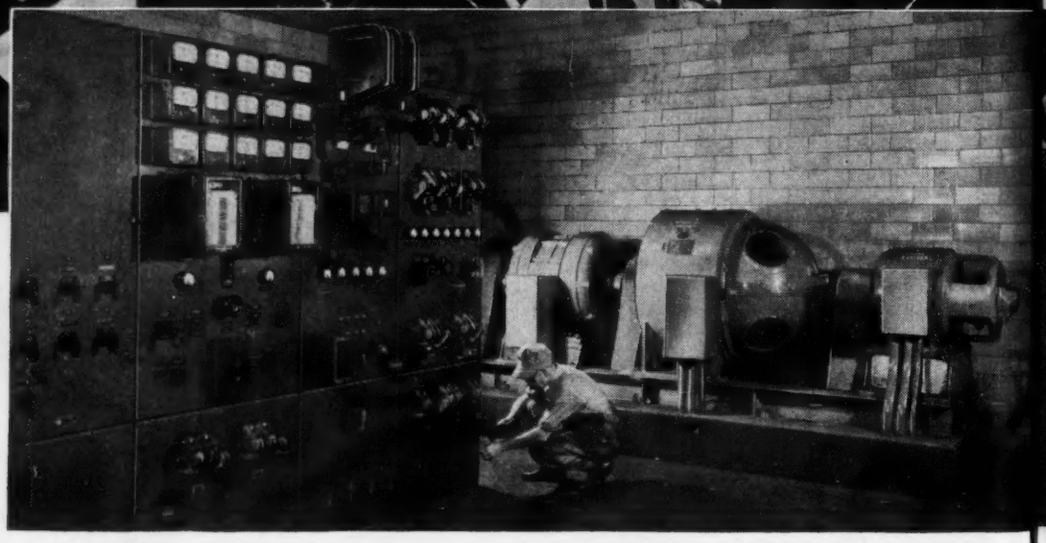
4720

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN

CALL ON ALLIS-CHALMERS FOR...

THIS 7,000 HP MOTOR

operating a 44-inch reversing blooming mill is capable of exerting a repeated operating torque of 225 per cent of rating, and can exert 275 per cent of normal torque before circuit is interrupted.

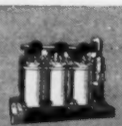


THREE PANEL CONTROL BOARD AND EXCITER SET

for the 7,000 horsepower reversing blooming mill motor. The number of contactors required is reduced to a minimum by the use of the *Regulex* control set described at the right. Fewer contactors greatly simplifies the installation and maintenance of control equipment.

Transformers

Switchgear and Switchboards



Rectifiers

Motors for Mill Drives

ALLIS

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

One of the Big 3 in Electric Power Equipment—

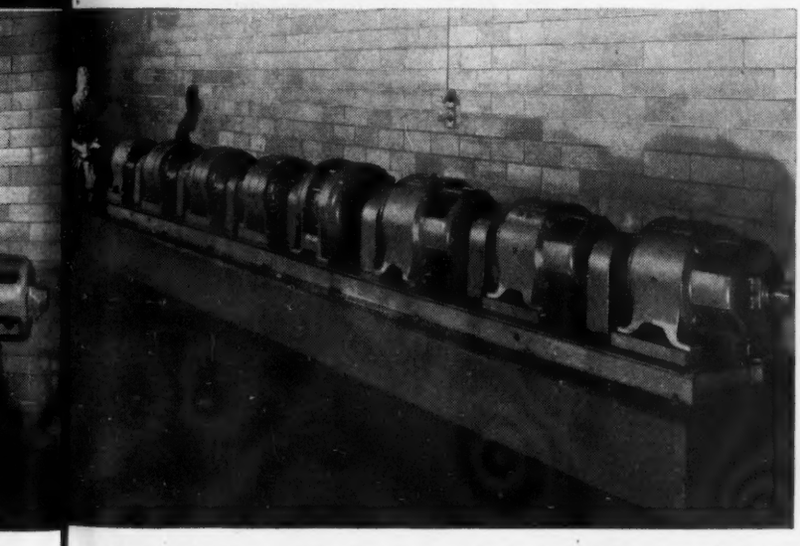
COMPLETE MAIN MILL DRIVES!

Whether you need power for a Blooming, Slabbing, Roughing or Finishing Mill, a Hot Strip Mill or a Cold Reduction Mill, Allis-Chalmers can help you!

OVER FIFTY YEARS' experience in the design and manufacture of electrical machinery has given Allis-Chalmers the ability to fulfill *completely* any main mill power and control requirements.

Here's typical evidence. In a large midwestern steel plant, from the Reversing Blooming Mill to the Finishing Mill, Allis-Chalmers has furnished *all* the main mill drives and control.

When you deal with Allis-Chalmers you enjoy practical benefits of A-C's long years of experience —you benefit by sturdy, generously proportioned design and long lasting construction which is typical of Allis-Chalmers equipment. ALLIS-CHALMERS, MILWAUKEE 1, WIS.



REGULEX EXCITER SET INSTALLATION

Regulex control provides uniformity of acceleration and maximum speed stability, and reverses motors in less than 2 seconds with current automatically limited to a safe operating value.

ALLIS-CHALMERS SYNCHRONOUS M-G SET

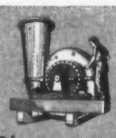
used to support a 5,000 horsepower intermediate mill motor. Set consists of two 2,000 kw, 700 volt d-c generators driven by a 6,000 hp, 6600 volt, 514 rpm synchronous motor.

A 2214

CHALMERS

Steam and Hydraulic Turbines

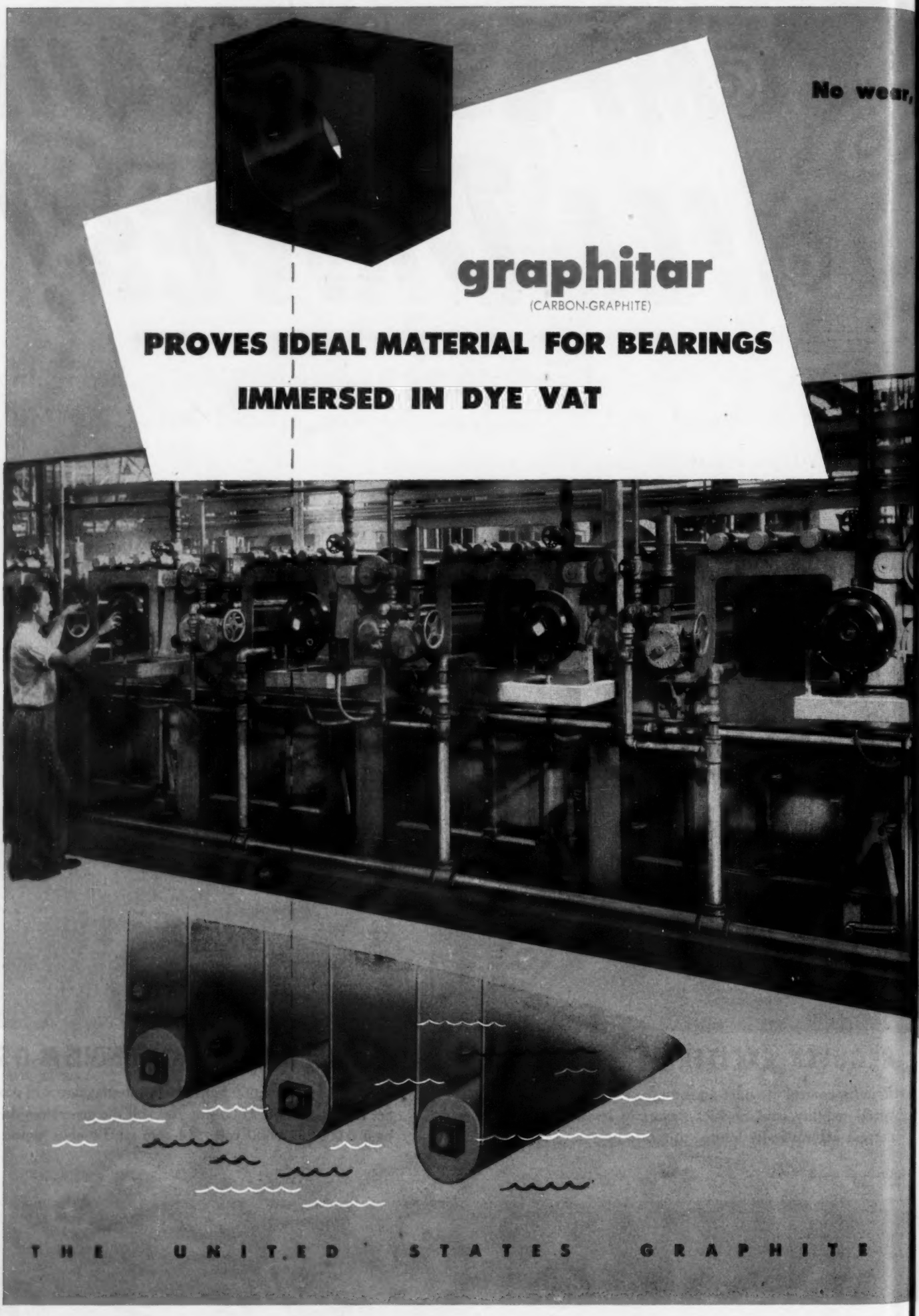
Centrifugal Pumps



Blowers and Compressors

Texrope V-Belt Drives

Biggest of All in Range of Industrial Products

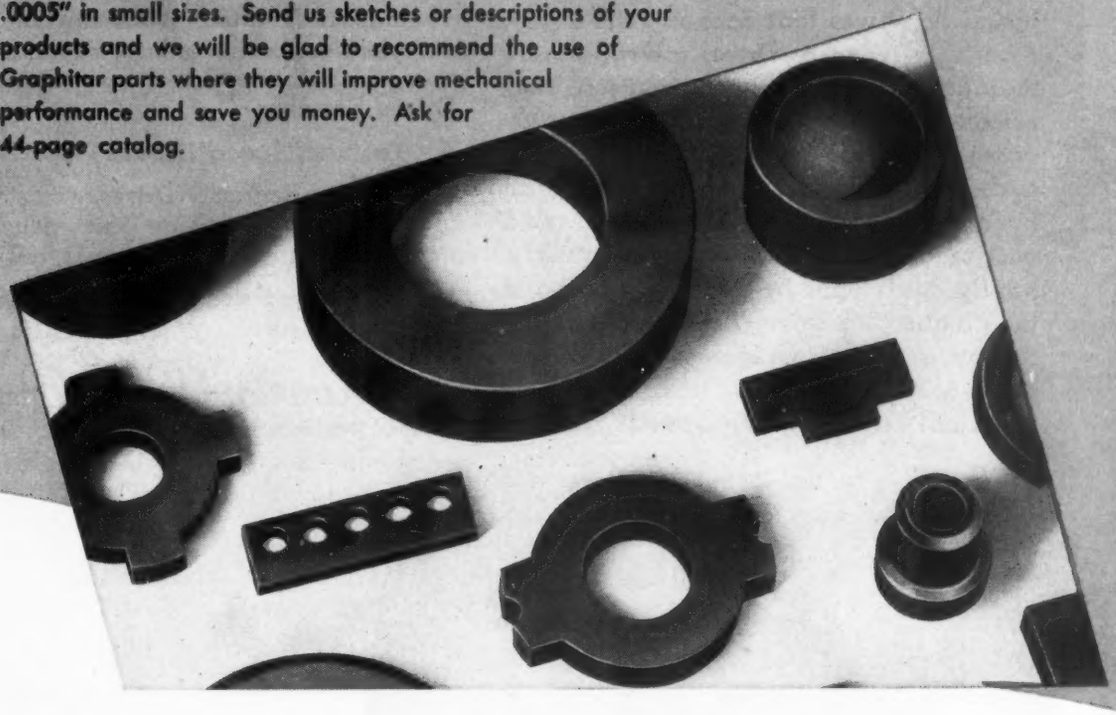

No wear, no
graphitar
(CARBON-GRAPHITE)
PROVES IDEAL MATERIAL FOR BEARINGS
IMMERSED IN DYE VAT
THE UNITED STATES GRAPHITE

...no corrosion, chemically inert Graphitar Bearings play large part in trouble-free operation of H. W. Butterworth & Sons Vat Bleaching and Dyeing Machinery

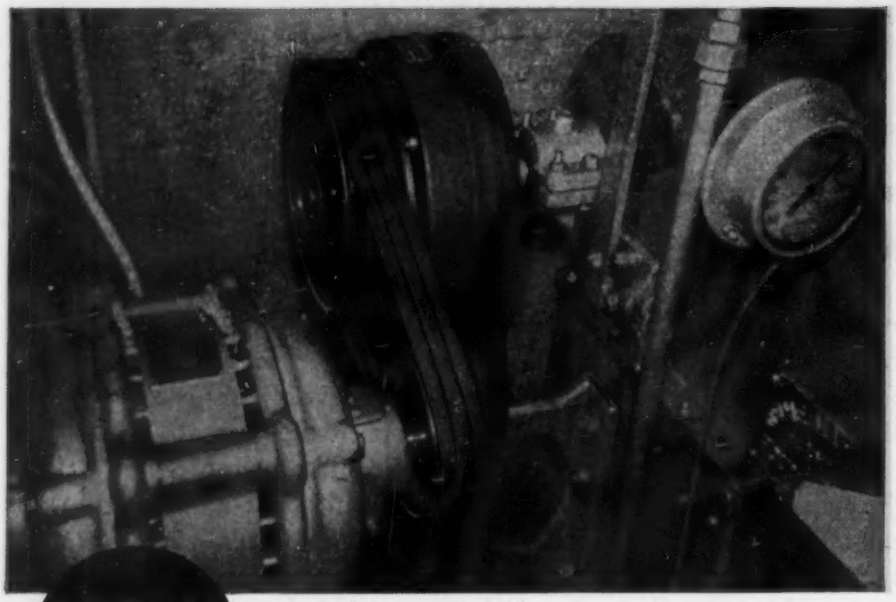
Acids and strong alkali solutions that corrode conventional bearing materials have no effect on Graphitar . . . because Graphitar is chemically inert. That's why engineers of the H. W. Butterworth & Sons Co. of Philadelphia, manufacturers of finishing machinery, specify Graphitar bearings for the submerged rollers in their vat dyeing and bleaching ranges that are known throughout the textile industry for their dependability. Although completely submerged in corrosive dyes and bleaches, the Graphitar bearings dependably resist chemical attack and assure smooth, uninterrupted operation for the rollers that carry fabrics through the finishing process. In fact, these bearings are lubricated by the solution in which they are submerged, hence require no maintenance.

Graphitar Bearings, Seals, Bushings cut maintenance and improve operation of scores of products and machines

Chemical inertness is only one of Graphitar's many characteristics that make this unusual carbon-graphite composition the ideal material for bearings, seals, bushings, and other parts for pumps, compressors, torque converters, and scores of different type mechanisms. Graphitar is mechanically strong. It will not melt or fuse at any temperature. It is self-lubricating. We are equipped to produce Graphitar parts in any practical shape and to tolerances as close as .0005" in small sizes. Send us sketches or descriptions of your products and we will be glad to recommend the use of Graphitar parts where they will improve mechanical performance and save you money. Ask for 44-page catalog.



COMPANY • SAGINAW, MICHIGAN



Machine down-time for repairs was eliminated, maintenance cut 90%—on this machine operated at 22 rpm. by an American Reduction Drive. Installation took just 3 hours, floor space was saved and shock loads eliminated. Yes, it's *"Tailored Speed"* for Top Production!

NOW For Top Production It's *"Tailored Speed"* That Counts!

How "TAILORED SPEED" Helps You Boost Output On Slow-Speed Machines

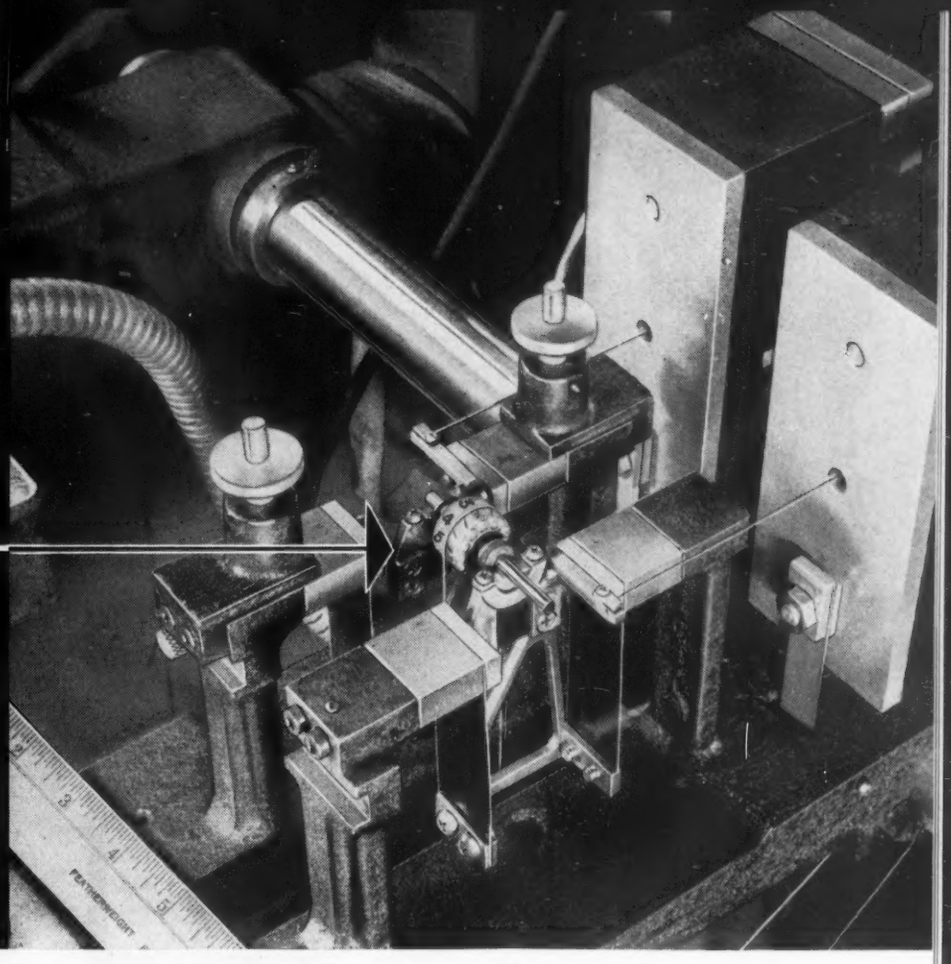
Here's a *different* reduction drive principle that really opens the door to maximum machine output! Yes, it's the unique *"Tailored Speed"* principle of American Reduction Drives that does it. Here's why: American Reduction Drives give you *more* than just the right speed for your job. They safeguard motor and gears from costly damage because the primary belt drive absorbs shock loads. Further, American Reduction Drives are easy to install. And once on the job, speed changes are quickly, *easily* made—just by altering the ratio of the primary belt drive. The result is higher operating efficiency, less machine down-time—a drive virtually "tailor-made" for *your* job! Yes, *"Tailored Speed"* adds up to increased production—rock-bottom maintenance costs!

Take this sure step for top production, now. Give your slow-speed equipment all the advantages of American Reduction Drives. For complete engineering data, drop us a line requesting the American Reduction Drives Handbook.

- *"Tailored Speed"* Means Versatility Too!
- American Reduction Drives, with standard 13 to 1 ratio Reduction Units, deliver any required output speed from 11 to 154 rpm.
- Six standard sizes will handle jobs from 1/4 to 25 hp.

The American Pulley Company
4286 WISSAHICKON AVE., PHILADELPHIA 29, PA.

IS DYNETRIC* BALANCING *important on such small parts?*

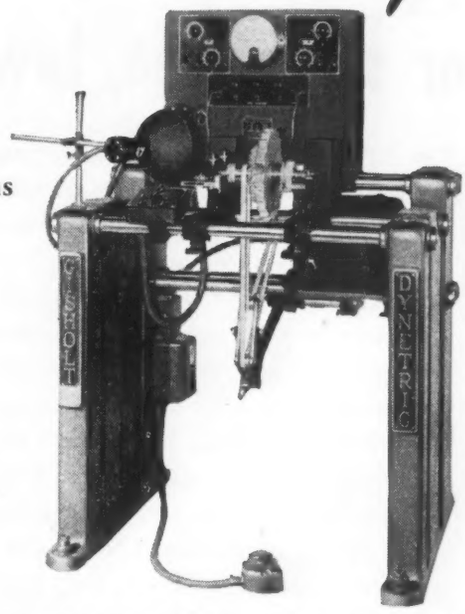


this manufacturer thinks so... *here's why...*

These tiny induction motors are used to operate record playing and record changing equipment. The manufacturer found that when armatures are not accurately balanced, considerable power is lost at the output shaft of the motor. Still worse, vibration in the record playing equipment not only impairs the tone quality of the machine but also shortens the life of the records it plays.

Where faithful reproduction is so important, is it any wonder the manufacturer protects his product through Dynetric balance of these vital parts? It is something to look for when you buy a phonograph.

And it is a good time to ask yourself where Dynetric Balancing can improve your product with smoother, quieter, vibrationless operation. Gisholt Dynetrics put balancing on a low-cost basis. Ask for the facts about them.



The Gisholt 1S Dynetric Balancing Machine handles parts up to 30 lbs. Other models are available to handle any size part from a fraction of an ounce to many tons. All provide a modern means for quickly measuring *and* locating *unbalance and for accurate correction. Write for literature.*

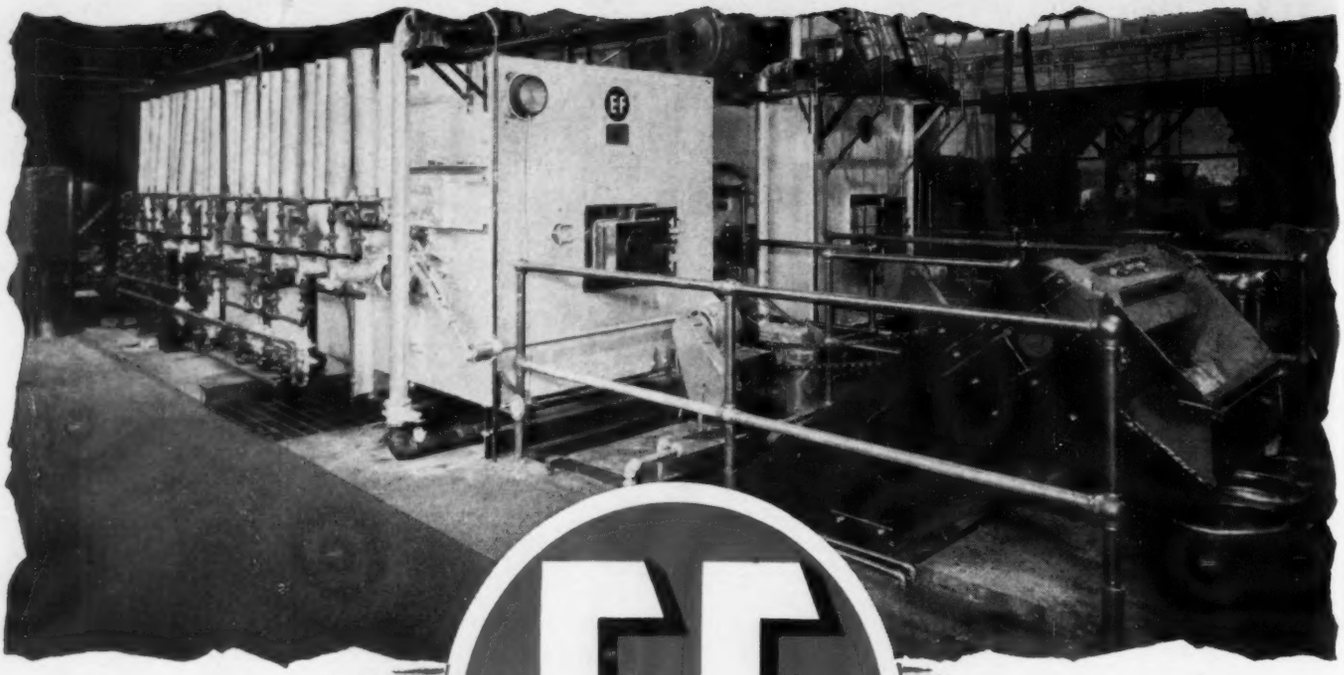
GISHOLT MACHINE COMPANY
Madison 3, Wisconsin

**Developed jointly with Westinghouse Electric Corporation*

turret lathes • automatic lathes • superfinishers
balancing machines • special machines

GISHOLT

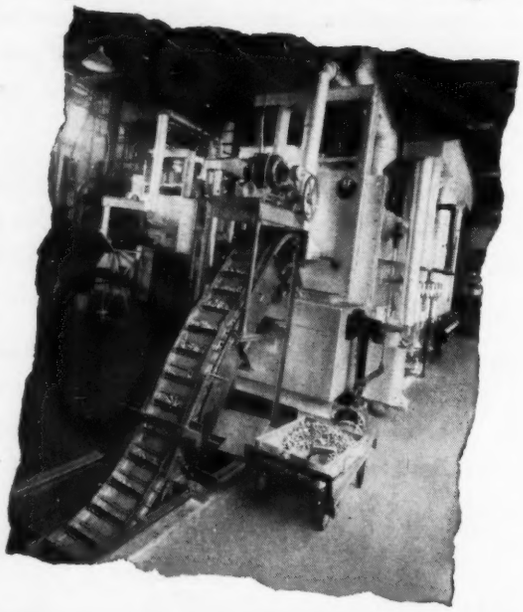
THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface finishing and balancing of round or semi-round parts. Your problems are welcomed here.



CHAIN BELT FURNACES

for scale free, low cost small parts hardening

● EF continuous chain belt conveyor type furnaces are unexcelled for the low cost, continuous heat treatment of small and medium sized parts ranging from springs, bolts, nuts and cap screws to tractor and automobile parts, gears, hand tools and similar products. The material to be treated is loaded directly onto the cast link heat resisting belt, is carried into the furnace automatically, uniformly heated to the proper temperature, quenched and discharged. These furnaces are available in gas fired, oil fired and electric types, in 11 standard sizes. Each is readily adapted for use with special protective atmospheres, for heat treating and hardening without scaling or decarburization. But send for our 12 page Bulletin No. R-1 —"Chain Belt Conveyor Furnaces"— and let EF engineers, with their long and successful experience, work with you on your next heat treating job.



THE ELECTRIC FURNACE CO.

WILSON ST. AT PENNA. R.R.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem-Ohio

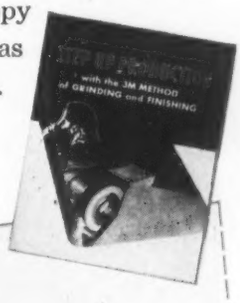
"31% FASTER THAN SET-UP WHEELS"

. . . says this Chicago polishing shop

With thousands of cold rolled steel stampings to be finished for plating, this polishing shop needed speed and more speed.

At the suggestion of a 3M representative, set-up wheels were replaced with 3M Backstand Belts, Grit Nos. 150 and 220 greased, and a 12″ x 3″ sewed buff contact wheel operating at 8000 surface feet per minute. Results have been a 31% increase in the number of stampings finished per day . . . less strain on the operators . . . less than one-half the number of rejects.

Similar savings are being made with the right combination of contact wheel and 3M Backstand Belts in many other shops. Some interesting examples of these savings are given in our new booklet, "Step Up Production", now being printed. Your name on the coupon below will bring you a copy of this new booklet as soon as it is available.



S 447

Please send us, without cost or obligation, a copy of your new booklet, "Step Up Production".

Name _____ Title _____

Firm _____

Address _____ Zone ____ State ____

City _____

3M

BACKSTAND BELTS

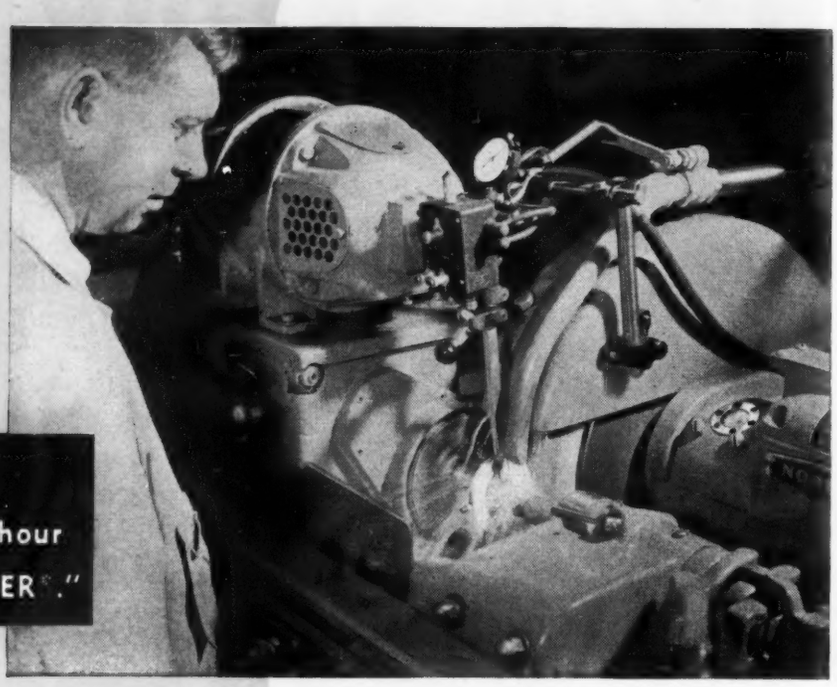
Made in U. S. A. by

MINNESOTA MINING & MFG. CO.

THE 3M COMPANY

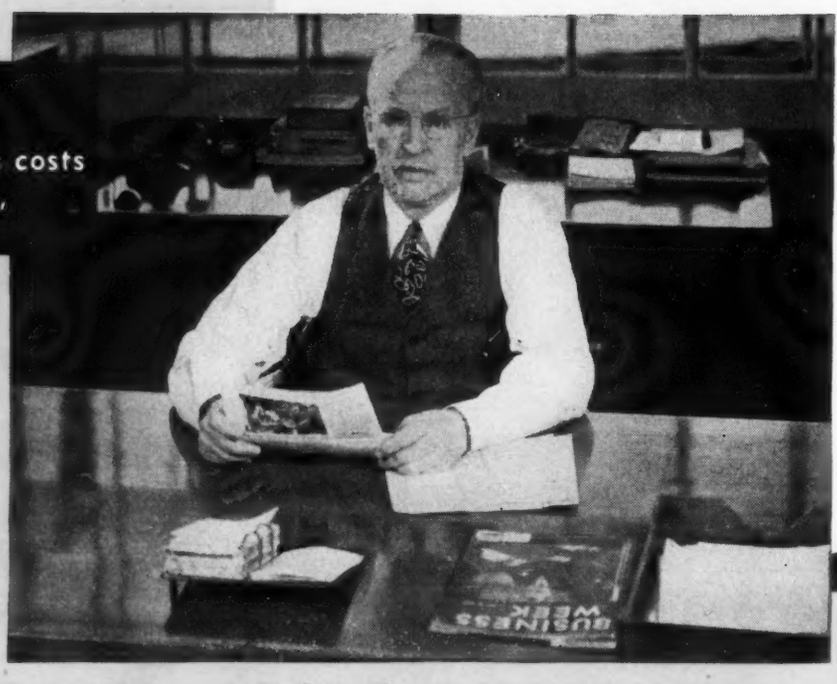
SAINT PAUL 6, MINNESOTA

Problems with Sizing?



The Operator Says

"Grinding to .0001" hour after hour is a cinch with the NORTONIZER®."



The Superintendent Says

"The NORTONIZER® sure cuts costs and improves quality control."

The NORTONIZER* is the Solution for Close-limit, Plunge-grind Jobs!

Operator: "Yes sir! It's a cinch to grind to a 'tenth' hour after hour with the NORTONIZER*. All I have to do is load, start the cycle, put the caliper on, and let 'er grind. When she's to size, the wheel backs off automatically, ready for me to unload. And the work's right on the button each time — no trouble passing a tough inspector."

Superintendent: "Yes sir, the NORTONIZER* sure is a cost-saver. Because it sizes automatically, inspection is greatly speeded up. And because it sizes so accurately — right to a 'tenth' each time — scrap is almost nil, even with operators of only average skill. It's the best answer I know of for getting real production-precision at low cost."

NORTON COMPANY, WORCESTER 6, MASS.

New York - Chicago - Detroit - Cleveland - Hartford

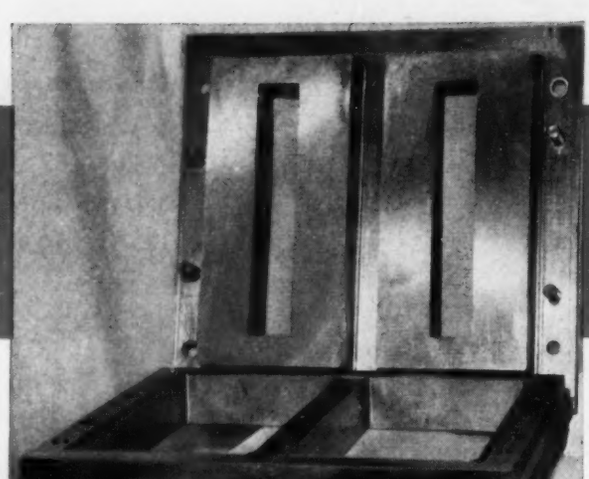
Distributors in All Principal Cities

M-537

NORTON GRINDERS and Lappers

*Trade-mark for Norton Automatic Work Sizing Device

Will You Take $3000.00 For 3 Minutes Time

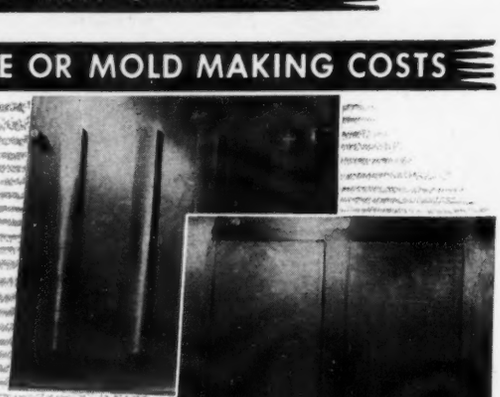


THREE MINUTES SPENT READING THIS AD MAY SAVE YOU

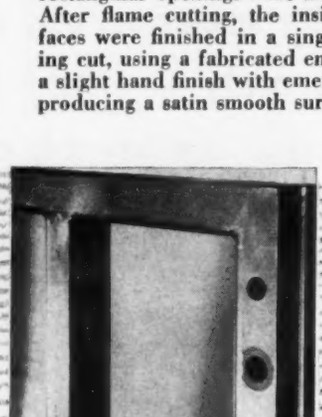
THOUSANDS OF DOLLARS PER YEAR IN DIE OR MOLD MAKING COSTS

Fast machining . . . smooth finish . . . longer tool life . . . are the qualities that can save you time and money, when you use *Speed Case* or *Speed Treat* Steel. MACHINE SPECIALTIES COMPANY, LYNN, MASS., for example, by using *Speed Case* plates instead of mild steel to make the mold set shown here, reduced machining costs over 51% . . . finish grinding operations were completely eliminated. . . *a saving of hundreds of dollars in a single job!*

The complete unit, used for molding a large rubber deep freeze gasket, consists of four parts. Main plate and "former" plate are shown above; plunger plate and bottom plate are shown to the right. Overall size is 26" x 28¼". "Former" plate machined from 5" thick plate. Main plate (lying flat) machined from 4" thick plate. A good demonstration of how *Speed Case* saves time and money lies in the making of the main plate. The two rectangular openings were flame cut. After flame cutting, the inside surfaces were finished in a single milling cut, using a fabricated end mill; a slight hand finish with emery cloth producing a satin smooth surface.



On every machining operation *Speed Case* Steel made possible important time savings . . . no matter how intricate the cut. In machining the bottom surface of the main mold, as an example, it was necessary to leave a thin wall or edge around each rectangular open section; this wall had to be .040" thick with an 18° bevel at its base. Free machining *Speed Case* made this a fast milling operation with tolerances easily held.



To save time . . . to save money that can total thousands of dollars per year, investigate your applications for Holliday *Speed Case* low carbon or *Speed Treat* medium carbon steels. Machinability, smooth finish, minimum warpage in heat treating or carburizing are a few of the advantages provided. In die work . . . or wherever considerable machining is required such as in hydraulic valve block production, Holliday steels will be important to you. Write for complete information.

W. J. HOLLIDAY & CO., INC.

Speed Case—Speed Treat Plate Division

HAMMOND INDIANA

Plants: Hammond and Indianapolis, Indiana

SPEED CASE
LOW CARBON
AND
SPEED TREAT
MEDIUM CARBON
OPEN HEARTH
FREE MACHINING
STEEL PLATES

DISTRIBUTED COAST TO COAST IN ALL COMMON PLATE SIZES FROM THESE WAREHOUSES

AKRON 1, Ohio
The Burger Iron Company
BUFFALO 5, New York
Beals, McCarthy and Rogers, Inc.
BOSTON 10, Massachusetts
Brown-Wales Company
DETROIT 7, Michigan
Peninsular Steel Co.
HOUSTON 1, Texas
Earle M. Jorgensen Co.
LOS ANGELES 54, California
Earle M. Jorgensen Co.
MEMPHIS 2, Tennessee
Pidgeon-Thomas Iron Company
NEWARK 5, New Jersey
Grammer, Dempsey & Hudson, Inc.
OAKLAND 7, California
Earle M. Jorgensen Co.
PHILADELPHIA 34, Pennsylvania
Horace T. Potts Co.
CANADA: Toronto 2, Ontario, Peckover's, Ltd.

91 YEARS of STEEL 1850 1941

NEW! FOOLPROOF!

HANSEN

TWO-WAY SHUT-OFF COUPLING

SEALS BOTH ENDS OF LINE—
AUTOMATICALLY...INSTANTANEOUSLY

The new Hansen two-way shut-off coupling provides for easy—quick—safe connecting and disconnecting of hydraulic and pneumatic lines. This unique "spool type" valve coupling permits the instant sealing of each end of the lines immediately upon disconnection of plug from socket. To connect, you pull back sleeve and merely push plug into socket—coupling is connected and locked—valves in socket and plug are open, automatically permitting oil or gas to flow freely in either direction. To disconnect, push back sleeve — this disconnects coupling. Socket and plug are each positively sealed, automatically preventing loss or spillage of fluid. Check the many advantages in time, labor and cost savings provided in this new Hansen two-way shut-off coupling.

Full details in new Hansen Bulletin. Write for your copy.

REPRESENTATIVES

New England States:
A. D. GEIGER, Belmont, Mass.

Eastern, Southern States:
B-R ENGRG. CO., Baltimore, Md.

Northern Ohio:
F. & W. URSEM CO., Cleveland, O.

Southern Ohio, West Va., Ky.:
STEINHAGEN AIRLINE PRODUCTS, Dayton, O.

Northern Ill., Eastern Iowa:
NORRIS ENGRG. CO., Chicago, Ill.

Indiana, Wisconsin:
NEFF ENGRG. CO., Ft. Wayne, Ind.

Central Western States:
JOHN HENRY FOSTER CO., St. Louis, Mo., Minneapolis, Minn.

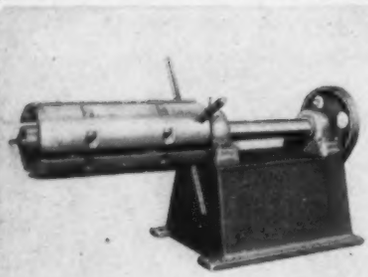
Western, Southwestern States:
BURKLYN CO., Los Angeles, Calif.

Northern Calif., Nevada:
H. E. LINNEY CO., Oakland, Calif.

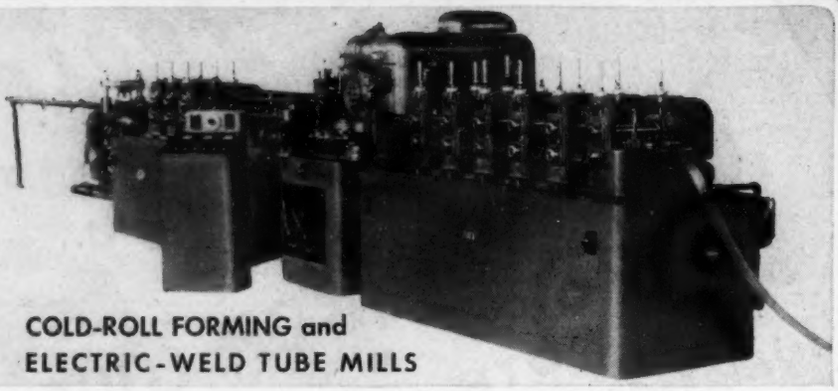
Michigan:
WM. H. NASH CO., Detroit, Mich.

THE HANSEN MANUFACTURING CO.

1786 EAST 27th STREET • CLEVELAND 14, OHIO

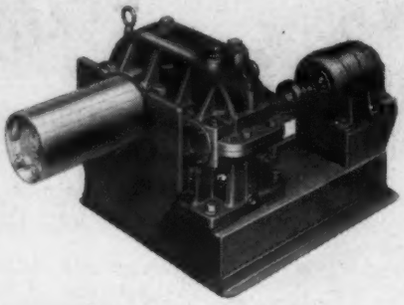


UNCOILERS

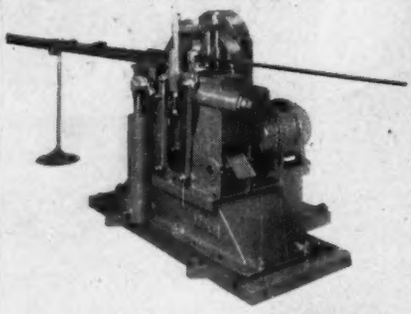


COLD-ROLL FORMING and
ELECTRIC-WELD TUBE MILLS

GANG SLITTERS



RECOILERS



AUTOMATIC CUT-OFFS

Consult Yoder on tooling for high speed automatic operations on COILED STRIP, SHEETS *and* PLATES

Yoder equipment has been highly standardized, after more than three decades of development, for automatic uncoiling, slitting and recoiling; cold-roll-forming of structurals, panels, tubing, mouldings and trim; welding of pipe and tubing; curving; coiling and ring forming; flying cut-offs; scrap chopping and roll grinding.

Special Yoder machines have also been designed for many similar purposes, such as tub beading, brake shoe and garnish moulding bending; strip, sheet and plate leveling, edge trimming, etc.

Yoder engineers are anxious to assist you in selecting and synchronizing machinery of this general character, whether made by Yoder or by others, into a smoothly functioning, high-speed production line. So again we say, if you have a production problem of this nature, feel free to

Consult Yoder!

THE YODER COMPANY
5502 WALWORTH AVE. • CLEVELAND 2, OHIO

ENGINEERING YODER MANUFACTURING

ROLL FORMING AND TUBE MILL MACHINERY

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSING • CURVING • WELDING • CUTTING-OFF

"Young Man with a HORN"

What appears to be a glass saxophone in the hands of a Sinclair Laboratory technician is in reality an important instrument used in protecting you against lubricants with low resistance to oxidation.

It's part of Sinclair's apparatus to determine oxidation rate of both non-additive and additive type lubricants. It is used constantly by Sinclair in Research and Refinery Control to assure you of maximum lubricant life without formation of harmful corrosive acids, varnish or carbon deposits on working surfaces.

Resistance to Oxidation is a prime requisite of all good lubricants. Sinclair's "Young Man With A Horn" — and others equally painstaking — stand guard constantly at Sinclair Laboratories to assure you that any Sinclair Lubricant you buy has the very highest degree of quality necessary for maximum operating efficiency.

Sinclair Metal Working Oils

For General Alloy Steels:
WILKUT OILS

For Tough Alloys:
AUTOKUT OILS

For Water Emulsions:
SATISOL and TOOLTEX

For Honing:
HONOL OILS

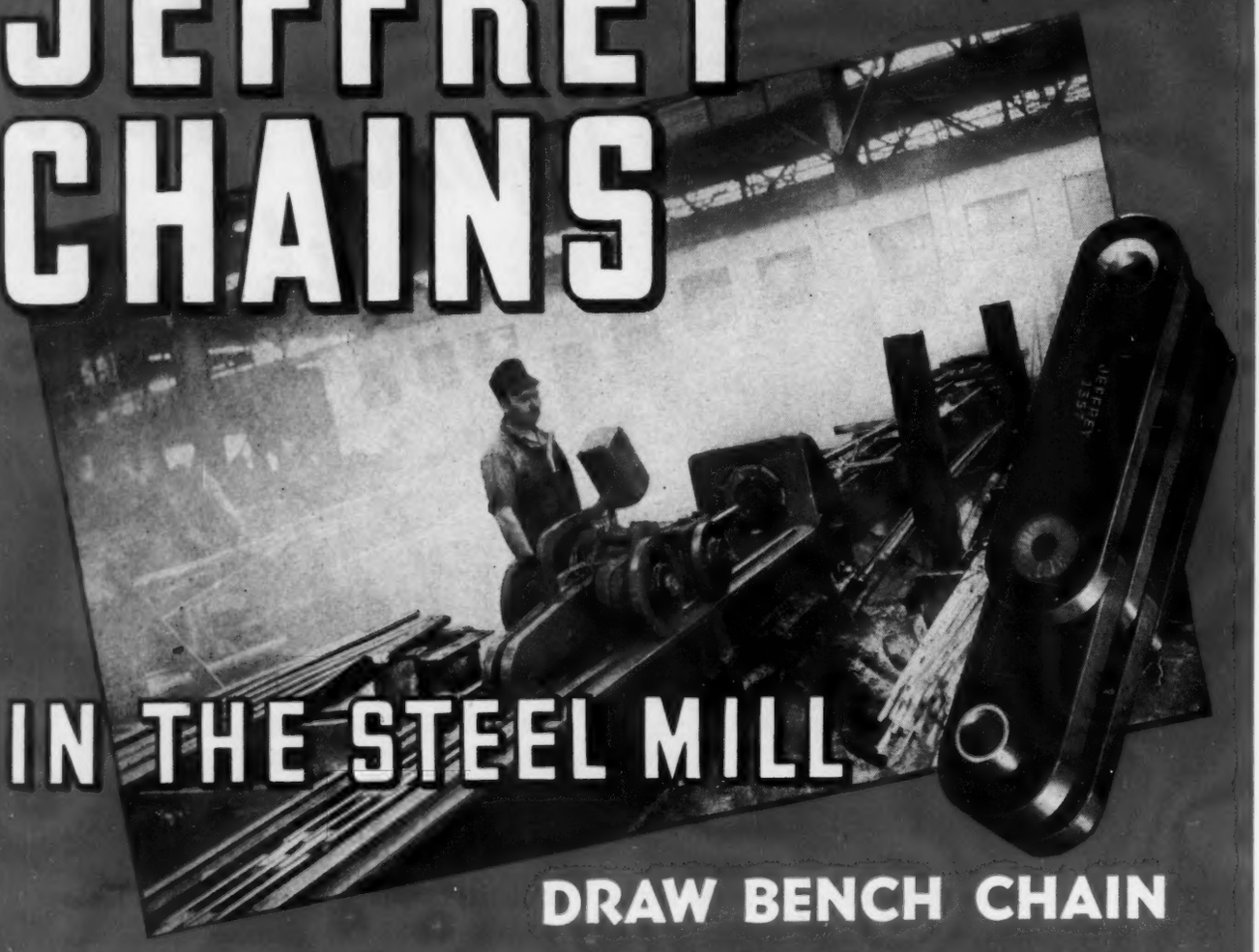
SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SINCLAIR

Lubricants for Industry

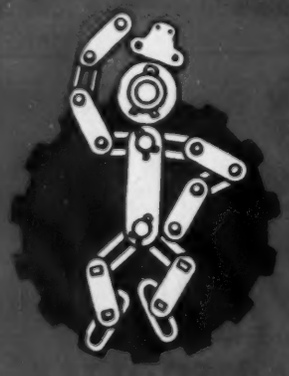
FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

JEFFREY CHAINS



IN THE STEEL MILL

DRAW BENCH CHAIN



A tug-of-war in Steel . . . you see it going on hourly and yearly on the draw bench. A battle between chain and bars with CHAIN invariably the victor when it is Jeffrey-made. This superiority reflects the stamina imparted by thorough methods, the care and scientific heat treatment employed in building Jeffrey chains for draw bench and other steel mill service. We bend over backwards to assure you of improved results in life and service from Jeffrey chains. Investigate their champion quality.

Also chains for Sheet Piling—Hot Slab Transfer—Crop Conveying—Feeder and Catcher Tables—Pusk and Pair Furnaces—Normalizing Furnaces.

THE **JEFFREY**

MANUFACTURING COMPANY ESTABLISHED 1877

889-99 North Fourth St., Columbus 16, Ohio

Baltimore 1 · Buffalo 2 · Cleveland 13 · Marion · Jacksonville · Pittsburgh 22
Birmingham 3 · Chicago 1 · Denver 2 · Houston 5 · Milwaukee · St. Louis 2
Boston 16 · Cincinnati 2 · Detroit 13 · Huntington 19 · New York 7 · Salt Lake City 1
· · · · · Philadelphia 3 · Scranton 3

Complete Line of Material Handling, Processing and Mining Equipment

G-E ELECTRONIC HEATER STRAIGHTENS KINK IN MILK-CAN PRODUCTION LINE

THE JOB...

One of the operations in the manufacture of milk cans in the Buhl Manufacturing Company, Detroit, Mich., requires annealing milk-can necks for the purpose of forming rolled lips.

THE OLD METHOD...

The cans were removed from the production line and the entire upper portion of the milk can was furnace annealed—a step which required two men. Following this time-consuming operation, the cans were pickled to remove scale and returned to the production line for further processing.

THE NEW INDUCTION METHOD

A G-E 15-kw electronic induction heater with a two-position fixture was installed directly in the production line, where one man now performs the entire annealing process. At one position, approximately one inch of the neck is brought to annealing temperature in the short time of 12 seconds, while the second position is being unloaded. By means of a transfer switch, power is applied to the other station, which has been reloaded.

HERE'S WHAT INDUCTION HEATING HAS DONE FOR THIS COMPANY—

1. **Increased production**—by making manufacture a continuous process—cutting annealing time to seconds—eliminating pickling.
2. **Cut costs**—by requiring less time and labor per unit.
3. **Better product**—by localizing annealing to the neck, giving the rest of the can greater resistance to denting or damage.

GENERAL ELECTRIC

WHAT CAN ELECTRONIC INDUCTION HEATING DO FOR YOUR PRODUCT?

We would welcome the opportunity to give you an unbiased answer to this question. Simply get in touch with the Heating Specialist in the nearest G-E Office. In the meantime, send the coupon for our free bulletin GES-3290A, "The How and What of Electronic Induction Heating."

Apparatus Department, Sect., A675-152
General Electric Company
Schenectady 5, N. Y.

Please send me your free bulletin GES-3290A, "The How and What of Electronic Induction Heating."

Name.....

Company.....

Address.....

City..... State.....

6766

. . . the labor-saving,
time-saving Wells . . .
a low cost solution to
your cut-off problems
WELLS No. 8
with wet cutting system
This new Wells system handles cutting fluids when desirable for tough sawing jobs or production work. Available to fit all Wells No. 8 saws

YOU WON'T find a better answer to all-around metal sawing problems than a versatile Wells. On miscellaneous cut-off jobs around the plant, or on steady production work, they can always be kept busy. ¶ A portable Wells will pay for itself quickly in your plant. Ask to see one in operation. Write for full details—or invite a representative to visit you.

Wells SAWS
THE SIGN OF SERVICE

Wells

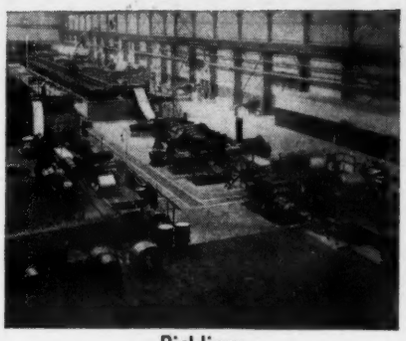
Products by Wells are Practical

METAL CUTTING BAND SAWS

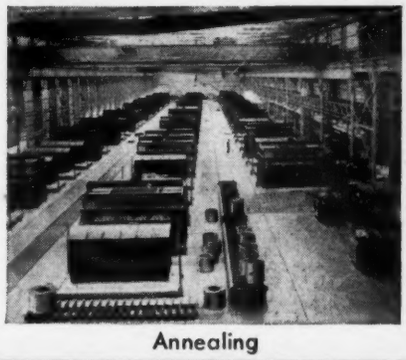
WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

WEAN ENGINEERING Company, Inc.

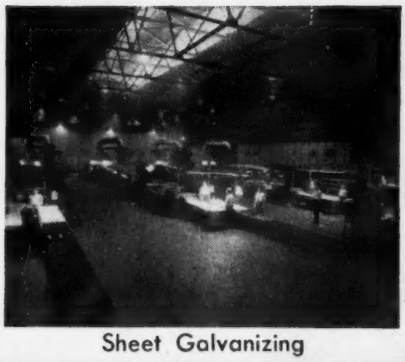
WARREN, OHIO



Pickling



Annealing



Sheet Galvanizing

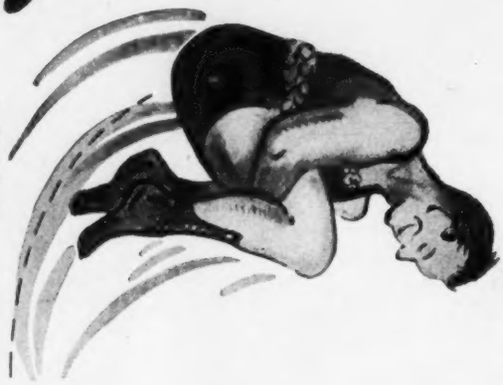
Shearing

- Continuous Strip Coiling Equipment
- Special Conveying Mechanism
- Automatic Pilers
- Uncoiling Units
- Press Feeding Equipment
- Slitters
- Strip Uncoiling and Automatic Shearing Units
- Strip Coil Holders
- Strip Coiling Reels
- Sheet Galvanizing Equipment
- Automatic Tinning Equipment
- Equipment for Chemically Treating Tin Plate
- Automatic Doublers
- Continuous Strip Pickling Equipment including: Uncoilers, Up-Cut Shears, Stitching Machines, Pinch Roll Units, Recoilers, Drying Machines, Pickling Tanks and Auxiliary Equipment
- McKay Levelers and Processing Units
- Strip Welding Equipment
- Scrubbing, Leveling and Oiling Machines for Flat Products
- Wilson Vertical Tube Type Annealing Furnaces
- Corrugated Inner Covers
- Automatic Feeding and Catching Tables
- Normalizing Furnaces
- Continuous Pack and Pair Heating Furnaces
- Wheelabrator Abrasive Cleaning Equipment
- Automatic Weight Classifier
- Automatic Gauge Classifier
- Vacuum Cup Lifters
- Electrolytic Tinning and Galvanizing Equipment
- Narrow Strip and Wire Mill Machinery
- Field Fence and Barbed Wire Machinery

SPECIALISTS IN SHEET, STRIP AND TIN MILL EQUIPMENT

IF THERE'S A *Spring* IN YOUR PROGRAM . . .

Remember that Gibson Springs are versatile . . . the Mechanical Precision ones are available for the Stellar Role . . . for the Supporting Cast, we'll supply millions if you need them . . . You know the ones we mean, not necessarily fussy, but Reliable and Steady Performers.

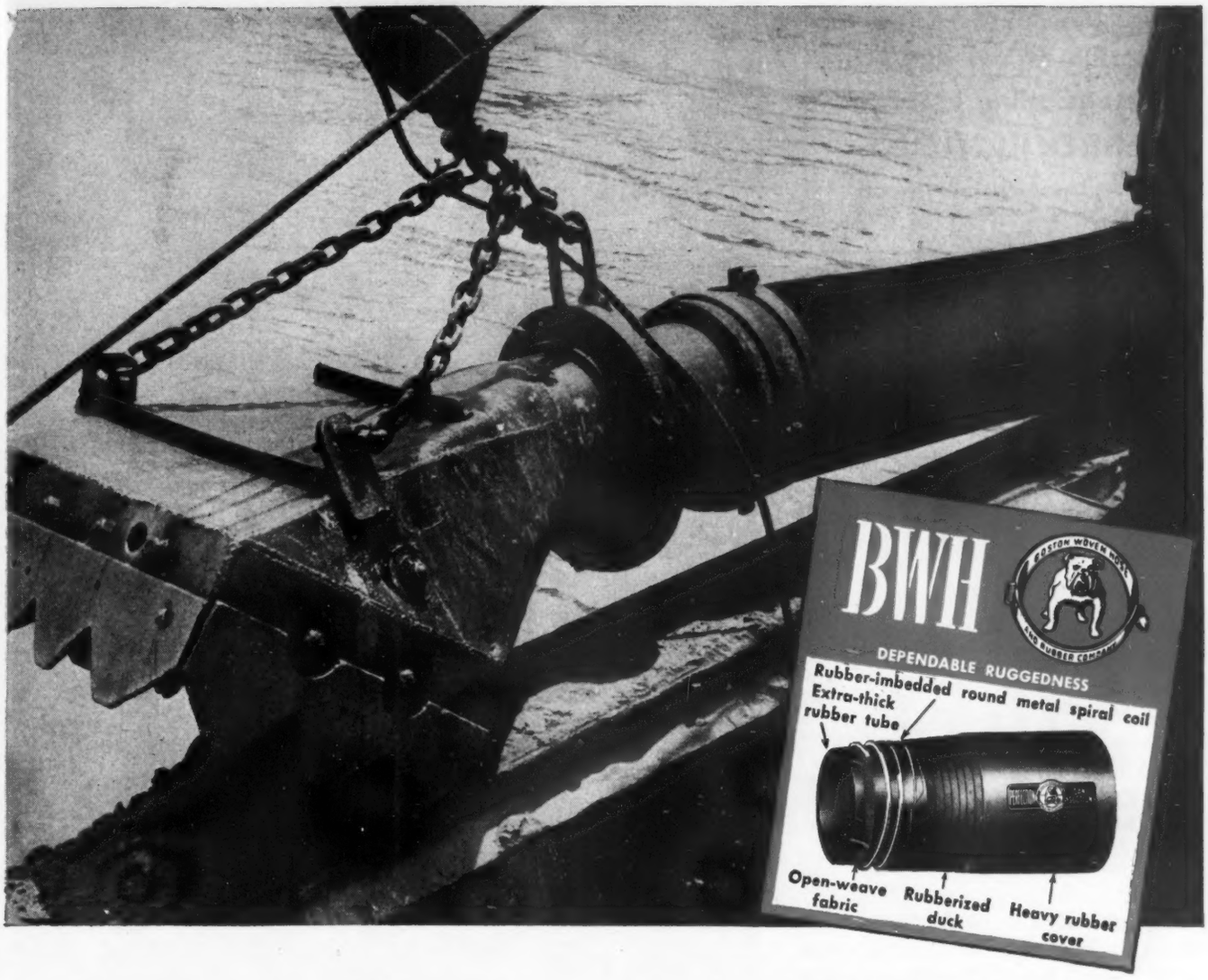


WIRE FORMS
SMALL
STAMPINGS
CLIPS—CLAMPS
and

Smooth Working
GIBSON-SPRINGS

THE WILLIAM D. GIBSON CO.
DIVISION OF ASSOCIATED SPRING CORPORATION
1800 CLYBOURN AVE., CHICAGO 14

Telephone MOHawk 6622



VACUUM CLEANER FOR HARBOR FLOORS

Another top performance by a BWH product

Keeping harbors safe for shipping is a tough, never-ending job. It calls for dredges to scoop up sand, mud, stone and other channel debris. The dredge's suction hose takes a real beating, because such highly abrasive materials pass through it constantly. What's more, the job must often be done in the face of strong variable winds and changing tides that buffet the vessel and subject the hose to severe strain.

No wonder the owner of a commercial dredging fleet was plagued by hose replacement problems . . . until he called on BWH for help.

Our engineers recommended Perfection Sand Suction Hose, designed especially for the hardest service. The tube through which all dredged materials must pass is made of the toughest, high-grade, wear-resistant rubber, tested for durability . . . in gauges to meet any operating needs.

An open-weave breaker strip fabric firmly welds rubber tube and carcass. To give the hose flexibility, a high-tensile spring steel wire is spirally embedded in the rubber. Plies of rubberized duck hold the wire firmly in place, and contribute to the general strength of the hose.

As a companion to Perfection Suction Hose, BWH recommended a Paramount wire-reinforced Dredge Discharge Sleeve. Used as the first connection between pump and pontoon line, the sleeve absorbs strain and prevents kinking. This worked perfectly. Hose and sleeve have now been in operation for a long period . . . proof of the economy of quality hose.

Perfection Sand Suction Hose is just one of the many quality products manufactured by BWH. Whatever your need for industrial rubber goods, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearby BWH distributor, or write direct.

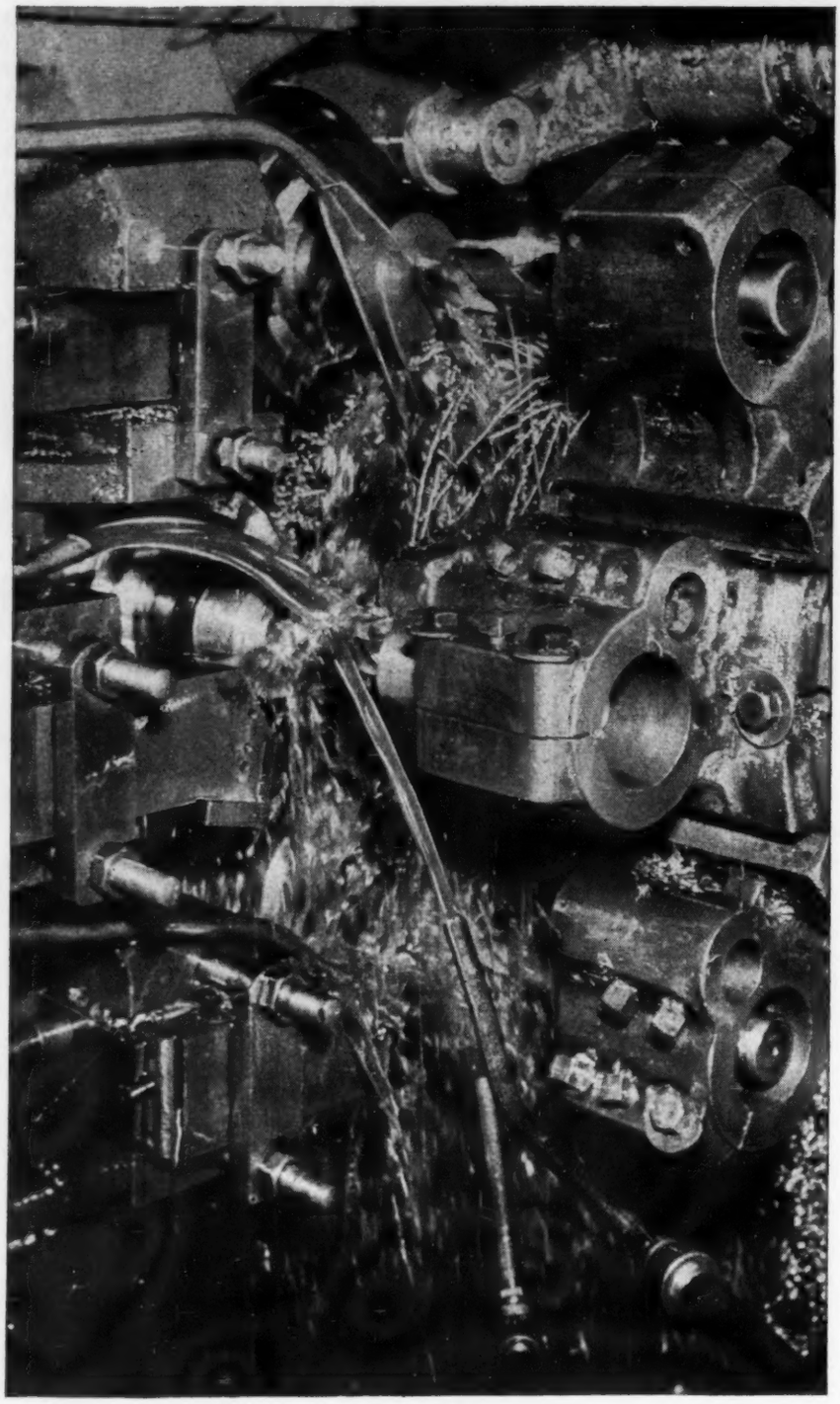
BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

Inside Knowledge on Metal Cutting Problems
—PRODUCTION—
This is One of a Series of Messages on Common Problems In Your Plant

How to Cut More Units Every 8 Hours!



IN PRODUCTION OPERATIONS (like this Conomatic shown cutting spur-gear blanks for tractor drives) the secret to greater output lies in high speeds maintained without interruption for long periods.

New light-colored, transparent, odorless S/V Sultran Oils are contributing to this objective in many shops.

On this particular operation, for example, speeds of 85 surface feet per minute might be considered as normal. With S/V Sultran, this machine is maintaining speeds 15% over recommended speeds. It is turning out one gear blank every 96 seconds.

With S/V Sultran, there has been no need to shut down the machine during the shift for tool replacement.

The new S/V Sultrans possess high film strength, exceptional oiliness and proper anti-weld qualities to make this possible. These transparent oils also provide greater drainability, lower consumption, and more pleasant working conditions.

SOCONY-VACUUM OIL CO., INC.
and Affiliates: Magnolia Petroleum Company, General Petroleum Corporation

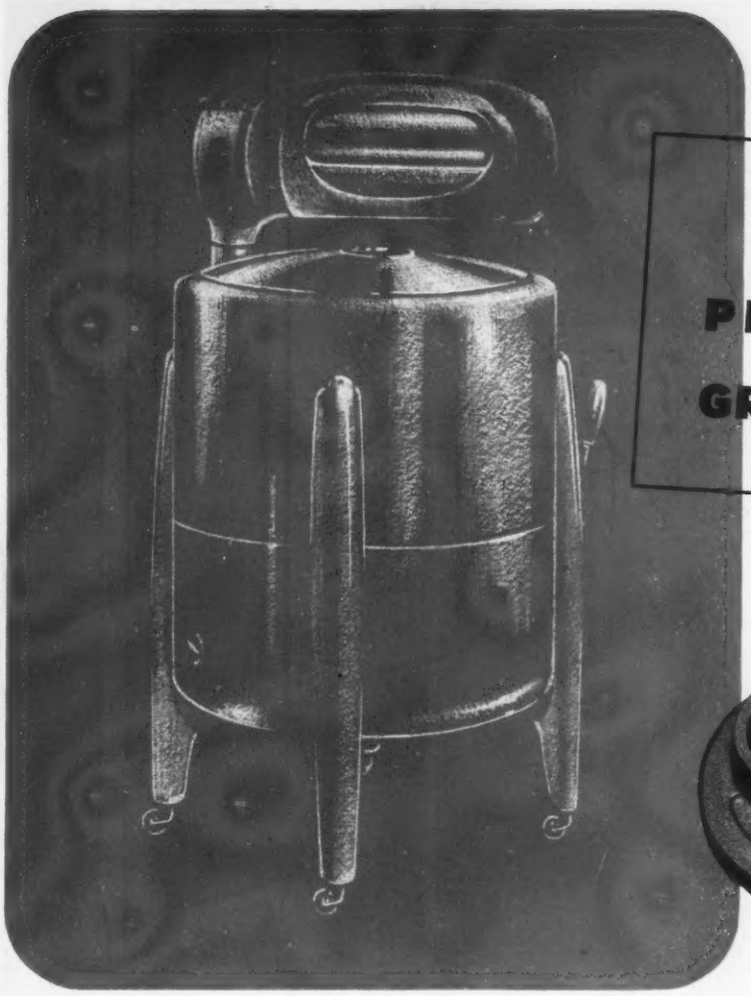
SOCONY-VACUUM

Lubricants

TUNE IN THE MOBILGAS PROGRAM — MONDAY EVENINGS, 9:30 E.S.T. — NBC

Socony-Vacuum Correct Lubrication

FOR EVERY MACHINE . . . EVERY OPERATING CONDITION



EATON
PERMANENT MOLD
GRAY IRON CASTINGS

Help Modern Washing Machines Stay "NEW" Longer

Free machinability, freedom from distortion after machining, and ability to take a high surface finish make Eaton Permanent Mold Gray Iron Castings ideal for gears and numerous other washing machine parts. Their uniformly dense, close grained structure permits holding close tolerances in tooth dimensions.

Eaton Permanent Mold Gray Iron Castings are equally well suited to a wide range of applications in refrigerators and other domestic appliances, including such critical parts as refrigeration valve plates, pistons, connecting rods, crankshafts, cylinder blocks, cylinder heads, pump bodies, and others.

Foundry Division engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your product.

Send for your copy of the new booklet, "The Eaton Permanent Mold Process."

© 1947, EATON MFG. CO.

THE EATON PERMANENT MOLD MACHINE IS A SYMBOL OF THE QUALITY OF GRAY IRON CASTINGS PRODUCED BY THE PERMANENT MOLD PROCESS.

EATON
MANUFACTURING COMPANY
FOUNDRY DIVISION
9771 French Road • Detroit 13, Michigan

Upton ELECTRIC SALT BATH FURNACES

What Depth do You Want?

7 FT. 15 FT. 25 FT. 50 FT. ?

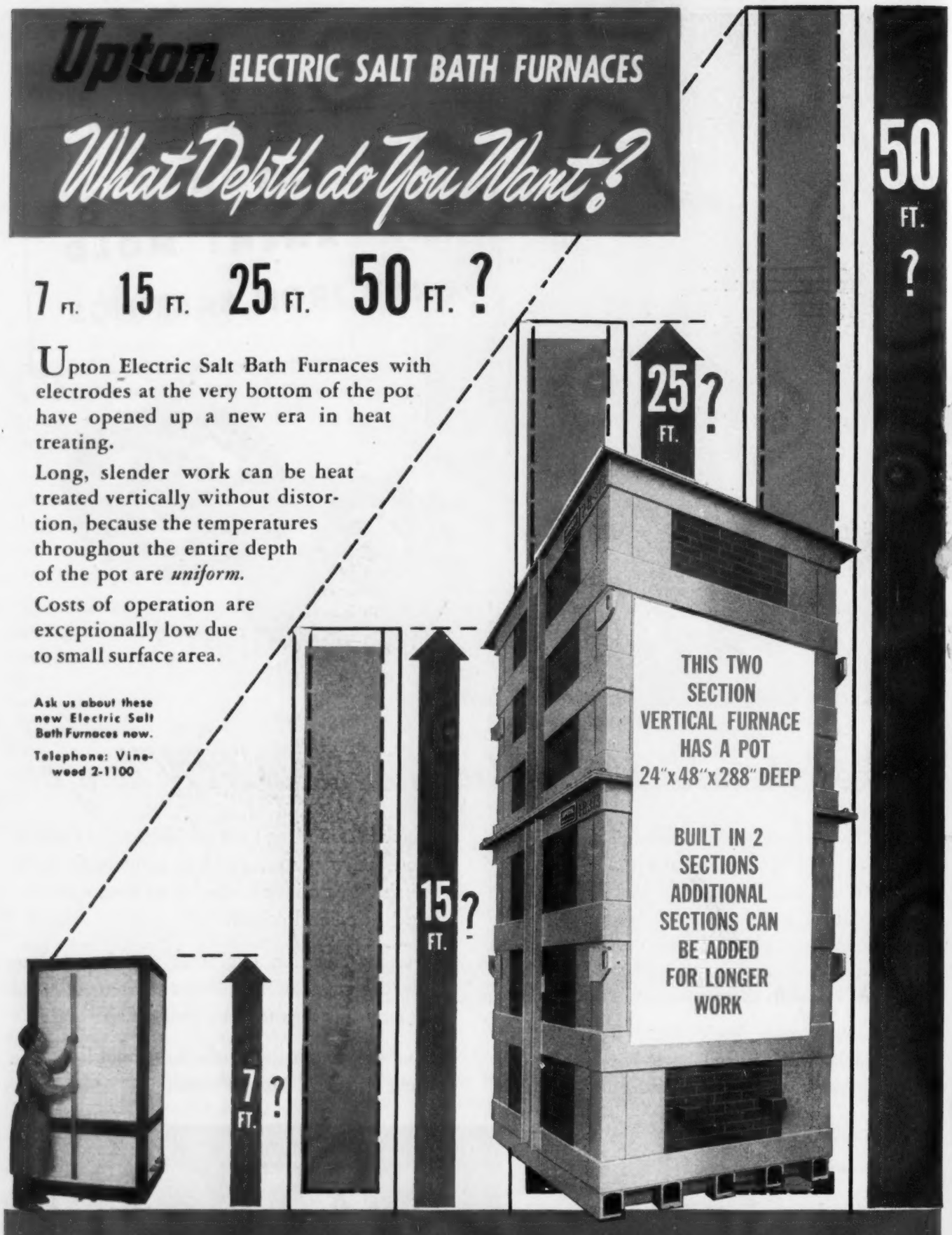
Upton Electric Salt Bath Furnaces with electrodes at the very bottom of the pot have opened up a new era in heat treating.

Long, slender work can be heat treated vertically without distortion, because the temperatures throughout the entire depth of the pot are *uniform.*

Costs of operation are exceptionally low due to small surface area.

Ask us about these new Electric Salt Bath Furnaces now.

Telephone: Vinewood 2-1100


50 FT. ?
25 FT. ?
15 FT. ?
7 FT. ?
THIS TWO SECTION VERTICAL FURNACE HAS A POT 24"x48"x288" DEEP
BUILT IN 2 SECTIONS ADDITIONAL SECTIONS CAN BE ADDED FOR LONGER WORK

Upton ELECTRIC FURNACE DIV.

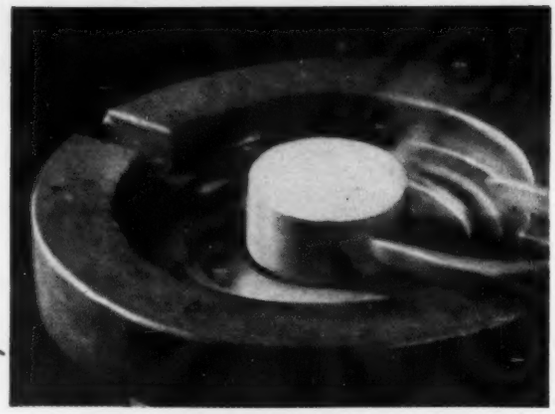
7455 MELVILLE AT GREEN • DETROIT 17, MICHIGAN

Anaconda HOT PRESSED FORGINGS
made by The American Brass Company

Illustrating the almost unlimited design possibilities in producing complicated or intricate parts of wrought Copper, Brass, Bronze or Special Copper Alloys. Additional information regarding this product appears on the following page.

Machined samples through courtesy of customers.

Here's how Anaconda Hot Pressed Forgings are made



1 a heated copper-alloy blank is centered in the die . . .

2 the dies close—with hundreds of tons of pressure . . .

3 and presto! — the metal is wrought into a semi-finished shape.

Of course, it isn't quite that simple. There are such matters as alloy composition, forging temperature, die design, trimming, piercing or sizing — but these are problems that we take care of.

and here's how they improve the product, reduce the cost

Anaconda Hot Pressed Forgings have twice the strength of sand castings—without the sand that causes needless tool wear. Absence of internal defects and a uniform, dense grain structure make them gas, air and watertight—able to withstand high pressures. Consistently accurate in dimension, they have a smooth, fine-textured surface and machine readily. Available in Copper, Brass, Bronze and Special Copper Alloys.

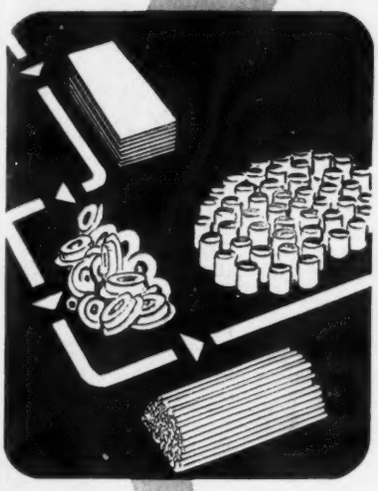
For typical examples of Anaconda Hot Pressed Forgings, see the preceding page. Inquiries regarding specific metallurgical, design, cost or production information will be given prompt attention. 43161

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

ANACONDA *Anaconda Hot Pressed Forgings*

A one-man order dept. on *wheels!*



JUST substitute steel, lumber, coal, castings, pipe or machinery components for concrete pipe and this storage yard could be yours. And so might the problem—fast, economical material handling requiring constant movement to service every nook and cranny of your yard.

The solution both here and in many industrial plants—installation of a Lorain TL-20 self-propelled crane. This one-man operated, single-engine unit moves around the yard as fast as a truck, features air steering for easy maneuvering, can be equipped with 15 different crane attachments for performing a wide variety of material handling jobs.

In addition to the self-propelled unit, the TL-20 offers a choice of several other rubber-tire mountings or a 2-speed chain drive crawler. Here's mobile, flexible "cranepower" at its best. For complete information, see your nearest Thew-Lorain distributor.

Reg. Trade Mark

thew-Lorain

THE
THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

1947

American Electroplaters' Society

34th Annual Convention

and

Industrial Finishing Exposition

DETROIT—*Plating Headquarters of the world*

June 23-27, 1947

Process Engineers
Production Engineers
Standards Dep't. Engineers
Laboratory Heads

CONVENTION HEADQUARTERS
HOTEL STATLER

•

EXPOSITION
CONVENTION HALL

Don't miss this opportunity to see the greatest display of new and up-to-date Plating and Metal Finishing Equipment and Supplies ever assembled under one roof.

Plan now to attend this mammoth display held in conjunction with the 34th Annual Convention of the American Electroplaters' Society.

Meet the men who can give ycu pertinent facts pertaining to recent developments in the metal finishing industry.

See how "the other fellow" is operating thru the Industrial Visitations the Committee has arranged as an Educational Feature.

See the diversified line of manufactured items which will be displayed at the Exposition.

The educational value of the Exposition cannot be over-emphasized. The buying public will see what is involved in producing metal finishes. The housewife will see a display of both manufacturing methods and finished products. The manufacturing executive will see metal finishing in all its phases. The electroplater and plant engineer will see the newest technical developments.

For information write

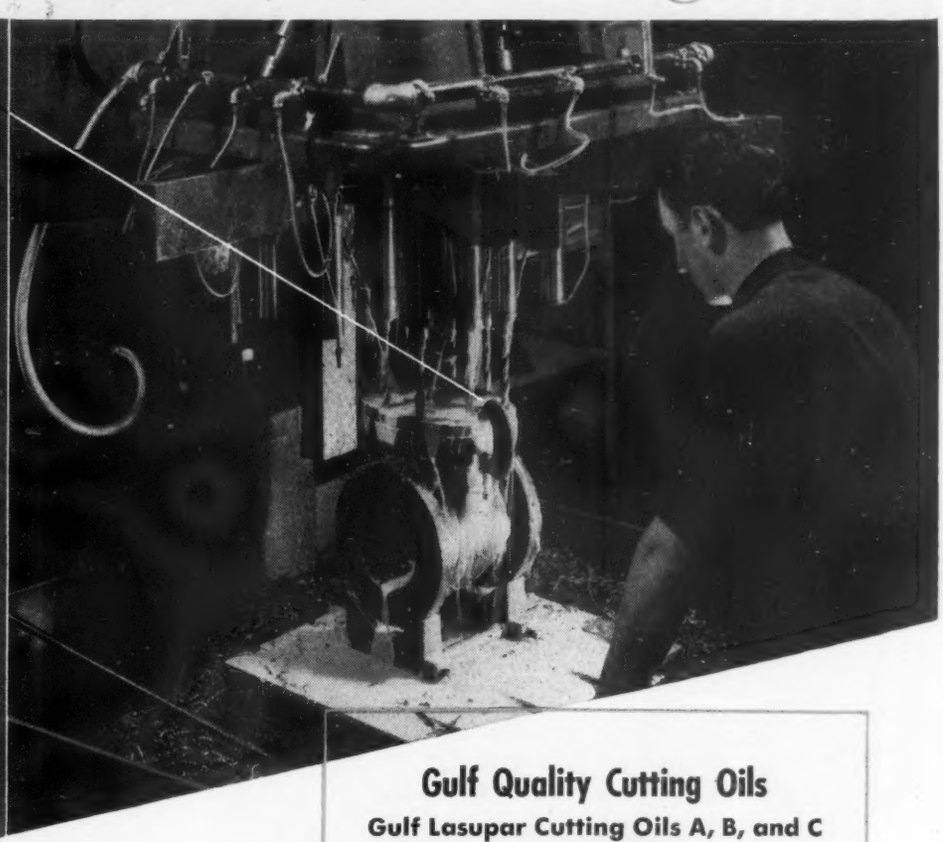
INDUSTRIAL FINISHING EXPOSITION

4484 CASS AVENUE · CONVENTION HALL · DETROIT 1, MICHIGAN

New–

Gulf Soluble Cutting Oil

Helps increase output and tool life!



Gulf Quality Cutting Oils

Gulf Lasupar Cutting Oils A, B, and C
Gulf Electro Cutting Oils A, B, and C
Gulf M-L Cutting Oils A, B, and C
Gulf Cut-Aid
Gulf Cutx B
Gulf L. S. Cutting Base A and B
Gulf Soluble Cutting Oil A

GULF SOLUBLE CUTTING OIL is setting new standards of performance for this type of cutting fluid in scores of shops!

Gulf Soluble Cutting Oil combines high cooling efficiency and superior lubricating qualities—a combination that insures maximum production and tool life and fine finishes on the work.

Other quality features of this new Gulf product include improved miscibility, exceptional stability, effective rust preventive properties, pleasant odor—and it's nonfoaming.

Call in a Gulf Lubrication Engineer today and let him demonstrate the many advantages of the new Gulf Soluble Cutting Oil in your shop. Or send the coupon below for folder which gives you further information.

GULF OIL CORPORATION · GULF REFINING COMPANY

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta · New Orleans · Houston · Louisville · Toledo

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company S
3800 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, further information on the new Gulf Soluble Cutting Oil.

Name.....

Company.....

Title.....

Address.....

Parco Lubrite Coating, Magnified 100 times.

PARCO LUBRITE HOLDS OIL

Faster Break-in, No Scuffing or Scoring, Less Subsequent Wear

Protection for wearing parts through the initial run-in period! Parco Lubrizing* is being used increasingly for this purpose. The coating is easily applied and is very effective, allowing faster, safer break-ins and minimizing the dangers of injury to expensive parts during this time.

Parco Lubrite's nonmetallic phosphate coating has a great affinity for oil, holds it through stresses and pressures, provides positive lubrication in operation. Metal-to-metal contact is avoided.

Many manufacturers today are using Parco Lubrizing on ring gears and pinions, crankshafts, clutch parts, cylinders, pistons, rings, valves, camshafts, pulleys, and universal joints.

To protect the wearing surfaces in the machine assemblies you build—Parco Lubrize! Write for full information today!

PROTECTED BY Parco Lubrite TO RETARD WEAR

PARKER RUST PROOF COMPANY • 2158 East Milwaukee Avenue, Detroit 11, Michigan

*Parco Lubrite—Reg. U. S. Pat. Off.

BONDERIZING Holds Paint to Metal

PARKERIZING Inhibits Rust

PARCO LUBRIZING Retards Wear on Friction Surfaces

PARKER PRODUCTS CONQUER RUST

TAYLOR-WINFIELD Portable Spot Welders

(AIR AND AIR-HYDRAULIC)

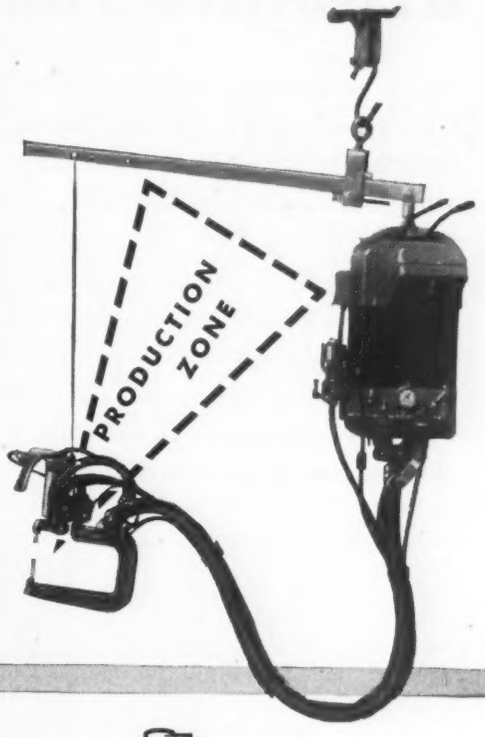
Which of these designs will help your production?

When a part is too bulky or too complicated to move to a resistance welding machine, take the welder to the part.

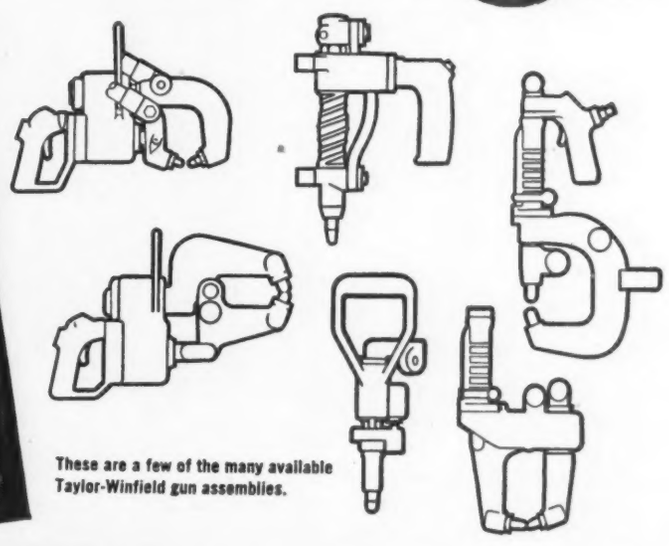
Taylor-Winfield makes a diversified line of portable spot welders, both air and air-hydraulic, many of which are illustrated here.

Because parts to be joined by resistance spot welding differ widely in size, shape, and weight, portable welders must be designed for specific work. Taylor-Winfield cuts the high cost of this procedure by standardizing on gun, *transformer and accessory designs.* With this unit principle of construction, many different combinations can be applied, without resorting to special designs.

Information on your requirements at your request.



A Taylor-Winfield portable spot welder in action. Taylor-Winfield also manufactures all forms of resistance welders (seam, spot, projection, and flash-butt.) All Taylor-Winfield welders feature the flexible production zone . . . more jobs on the same welder at less cost.



These are a few of the many available Taylor-Winfield gun assemblies.

TAYLOR-WINFIELD RESISTANCE WELDERS

The Taylor-Winfield Corporation

WARREN • OHIO

The Taylor-Winfield Corporation
Warren, Ohio

Send us Bulletin on Portable Spot Welders.

Name _____

Company _____

Address _____

City _____ State _____

announcing a basically new idea in resistance welding . . . . .

SYNCHRO-TROL Packaged Controls

You'll profit many ways from this newest Westinghouse first in resistance welding . . . Synchro-Trol controls that come to you as a factory-tested, factory-assembled, compact, packaged unit.

It simplifies your operation because it brings all controls together in one cabinet. You get swift, easy settings and tamperproof protection. It simplifies installation, for it eliminates multiple connections, awkward sizes and complicated mountings. You can save up to 50% in floor space. And it simplifies buying, since you select only the units you need.

You can choose from eight basic subunits and five auxiliary subunits to build up your Synchro-Trol (see panel), plus a blank panel to house any small controls required for your special process. Get the facts today from your nearest Westinghouse office on the ways Synchro-Trol can bring new flexibility to your resistance welding operations. Or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y. J-21418

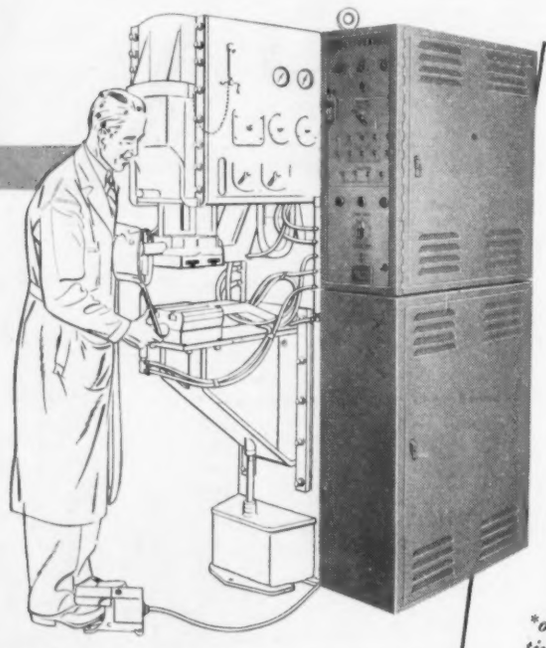


Illustration shows one type of arrangement for resistance welding. Panels can be substituted quickly and easily to employ other functions.

HERE'S HOW YOU CAN BUILD UP YOUR SYNCHRO-TROL

You take the basic units of Electronic Contactor and Heat Control . . .

add one of the following*

- Weld Timer
- Pulsation Weld Timer
- Electronic Seam Timer

and one of these*

- 7B Sequence
- 9B Sequence
- Blank Panel

and one of these (if you want it)

- Blank Panel
- Voltage Regulator
- Current Regulator
- Forge Timer

**or you can use an electro-mechanical seam timer or temper sequence.*

Get the full story in this new book that tells you how to form combinations of the subunits and gain the special advantages they offer. Ask for booklet B-3839.

Westinghouse
Synchro-Trol
Electronics at Work

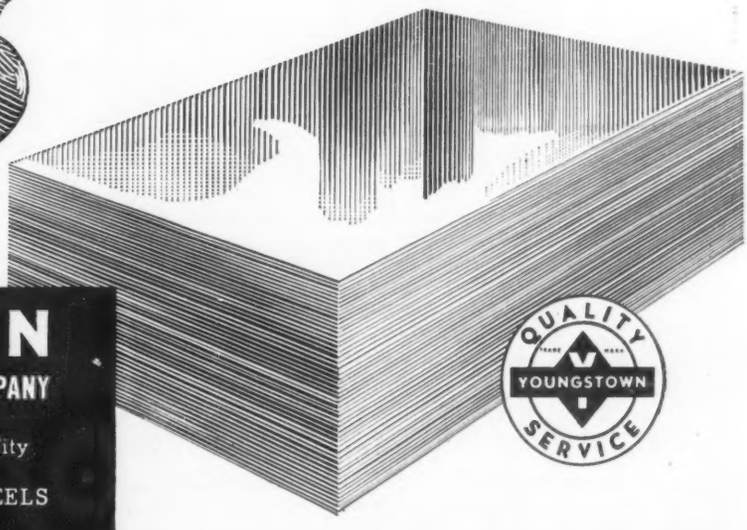
Speaking of the Law

ON enameling sheets, as with most other products, the law of supply and demand can effect a balance.

The supply of Youngstown Enameling Sheets will increase as our facilities can be further extended, as more labor becomes available, as more metal can be diverted from other channels. Meanwhile, the demand for sheets runs heavier than ever before, due not only to the increased requirements of our long-time customers, but also to the wants of many others whom we have never before served.

Right now, in the face of this unprecedented demand, with a definite limit on our output, we are furnishing our customers all the Youngstown Enameling Sheets we can make--taking the greatest pains to maintain our high quality standards as to purity of metal, ductility, strength, uniformity and surface finish.

Naturally, we wish we could serve new customers, too. We look forward to that time when we will be able to supply all the sheets wanted by customers, old and new alike.



YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Sheets - Plates - Pipe and Tubular Products - Bars - Rods - Wire - Cold Drawn Carbon Steel Rounds - Tie Plates and Spikes - Conduit - Electrolytic Tin Plate - Coke Tin Plate.

AIR COMPRESSOR LUBRICATION

Solving AIR COMPRESSOR TROUBLES

Lubrication Engineer's Report:

"A mining company* in the Joplin area was having trouble with the unloading valve on an Angle Compound Air Compressor. They were also troubled with discharge valve breakage of the high pressure cylinder.

"The previous oil was replaced with Cities Service North Star Oil No. 5 and not a single instance of gumming or sticking or trouble of any kind with the unloading valve or discharge valve has been reported in over two years."

Case No. 1:

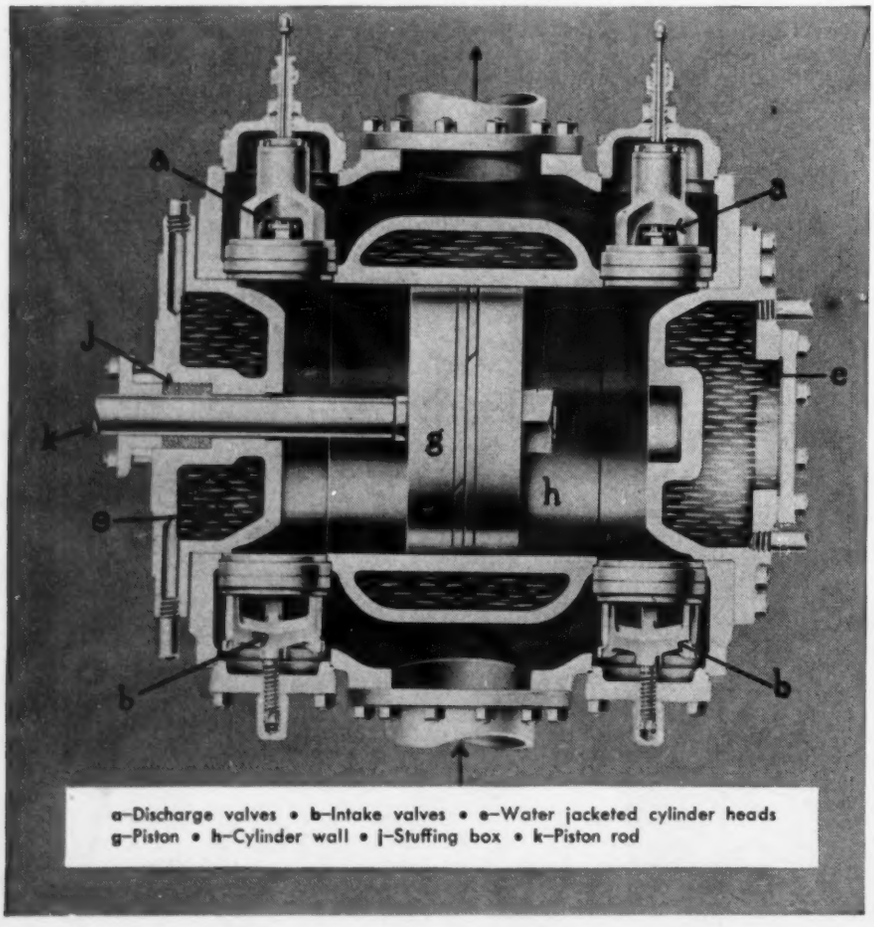
"A utility plant* in Springfield, Mo., uses compressed air from a single stage belt-driven air compressor in connection with overhauling jobs of the boilers in their plant. They are all of the water tube type and are overhauled at regular intervals. During these overhauls they need a constant supply of air. The unloading valve of this compressor would gum up to the extent that they would have to clean it about every other day when using a competitor's oil. I sent them a drum of Cities Service North Star Oil No. 5 about a year ago, and checked with their Chief Engineer last month. He tells me they haven't had to clean the unloading valve since putting in the North Star Oil."

Case No. 2:

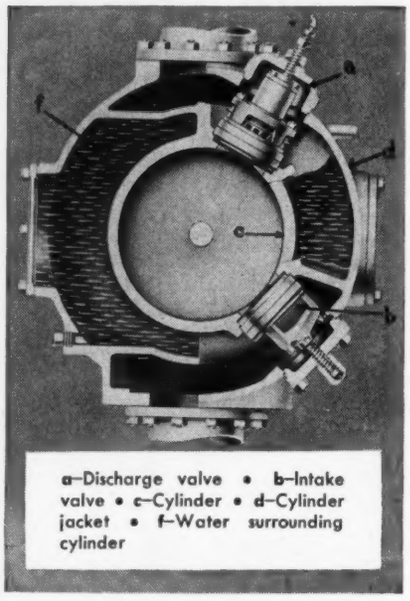
"We have lubricated a 1000 cubic foot two-stage air compressor in the Mid-Continent area for over three years. The customer* says that in using Cities Service North Star Oil No. 5 in this compressor he hasn't had any valve breakage and that carbon deposit on valves and seats has been down to practically nothing."

Case No. 3:

Names on request.



a–Discharge valves • b–Intake valves • e–Water jacketed cylinder heads g–Piston • h–Cylinder wall • j–Stuffing box • k–Piston rod



a–Discharge valve • b–Intake valve • c–Cylinder • d–Cylinder jacket • f–Water surrounding cylinder

Solving compressor operating problems has been Cities Service's special forte for years. A phone call or card to the Cities Service office nearest you will bring this engineering experience to *your* plant. There is no obligation. For useful information that every air compressor owner and operator should know, write for our free booklet, "Air Compressor Lubrication." Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y., Room 66.

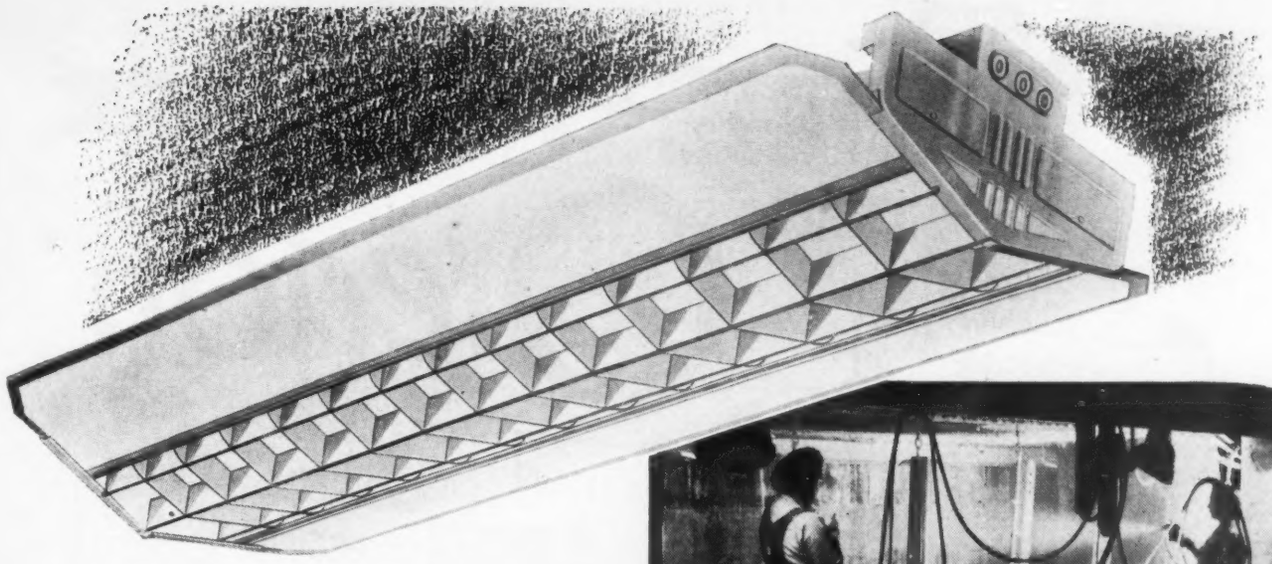
Free Booklet:

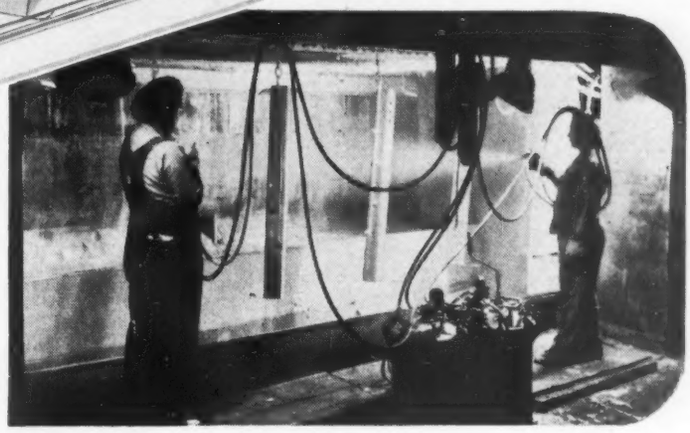
Cities Service means Great Service

CITIES SERVICE

Cities Service Oil Co.
NEW YORK · CHICAGO

Arkansas Fuel Oil Co.
SHREVEPORT, LA.





MORE LIGHT

on the advantages of

REPUBLIC ELECTRO PAINTLOK

—and it comes from a manufacturer of lighting equipment who uses this chemically-treated, zinc-coated steel sheet extensively in the manufacture of fluorescent fixtures.

He reports:

1. That ELECTRO PAINTLOK provides an excellent surface for 300° white baked enamel—that it produces a chip-proof, crack-proof finish that will not peel or craze.

2. That it protects against rust during storage in a high humidity area.

3. That it eliminates the need for pre-paint cleaning with a degreasing fluid—eliminates extra pickling for storage and recleaning before use.

4. That it is easy to handle—to fabricate—to weld.

Do you make a sheet steel product requiring painting, lacquering or enameling? Then you should learn more about Republic ELECTRO ZINC PLATED SHEETS—how they improve products—and how they cut costs. Write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic Electro Zinc Plated Products include ELECTRO PAINTLOK and ELECTRO ZINCBOND in sheets and coiled strip, in various widths depending on gauge involved.

Republic

REPUBLIC STEEL

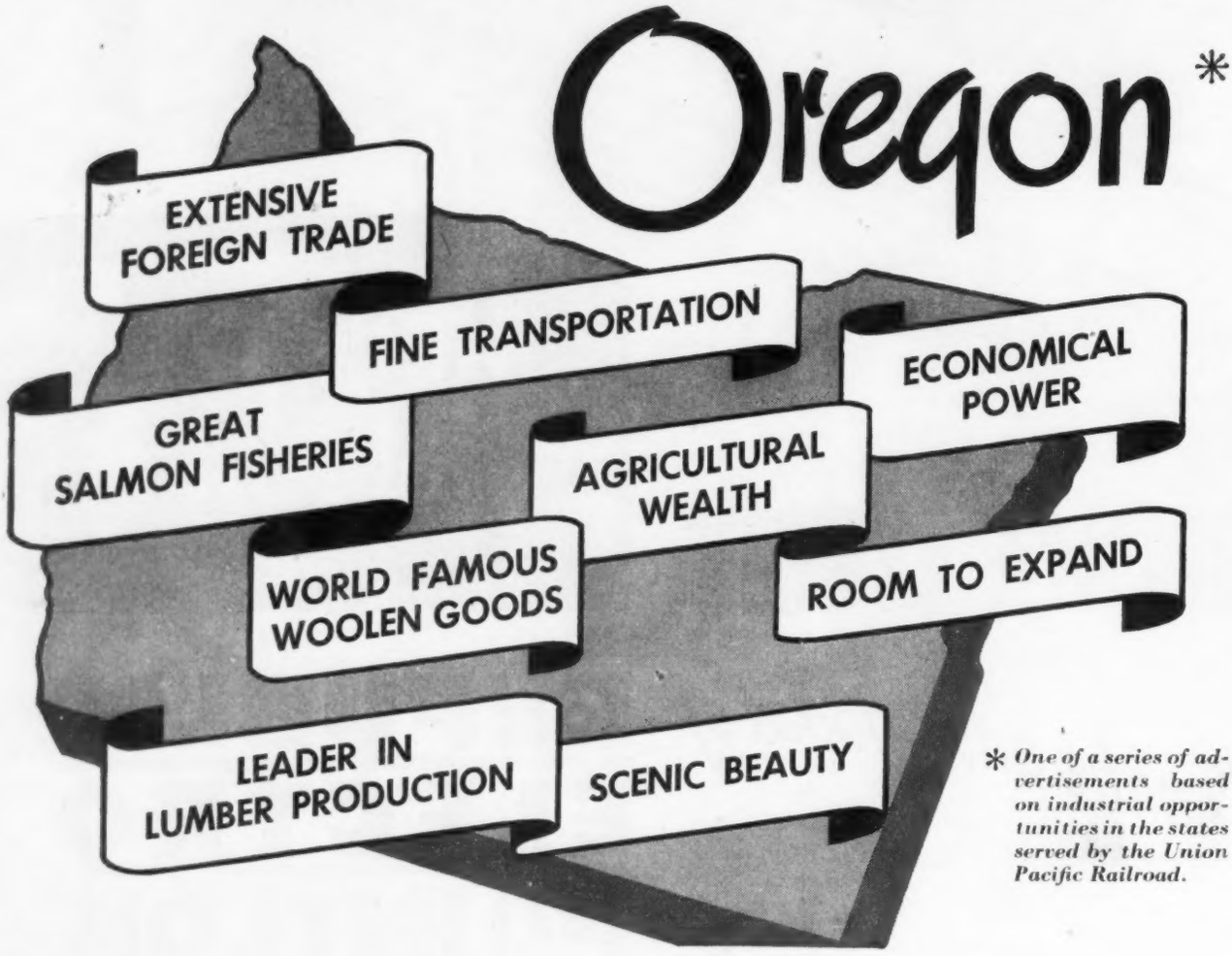
ELECTRO ZINC PLATED SHEETS

Electro Paintlok · Electro Zincbond

Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

UNION PACIFIC

TREASURE MAP OF INDUSTRY



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

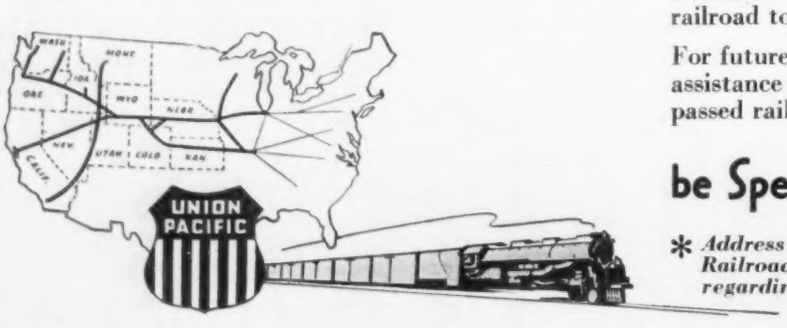
When the Beaver State presents its business card, it could justifiably read, "Enterprise, Unlimited." Industry re-discovered Oregon during the war. It found boundless opportunities capable of providing a livelihood for 10 times the state's present population.

Topographical, soil and climatic features make possible a variety of agricultural pursuits. The fabulous Willamette Valley—some three million acres—is a cornucopia of agricultural wealth. A tremendous quantity of lumber is available. The state has one-fourth of the country's standing saw timber. Salmon fisheries and woolen goods are world-famous. Portland's roomy harbor is a flourishing gateway of foreign commerce.

Huge Bonneville Dam assures ample and economical power. A new development program calls for four more dams. Oregon is noted for low electric rates.

Union Pacific provides Oregon with excellent freight and passenger transportation. Gigantic locomotives haul the state's products eastward over the "strategic middle route." And—just recently—Union Pacific inaugurated daily Streamliner service on the "City of Portland" between Portland and Chicago; the first railroad to provide such service.

For future industrial enterprise, remember Oregon. For assistance in selecting industrial sites and for unsurpassed rail transportation, just . . .



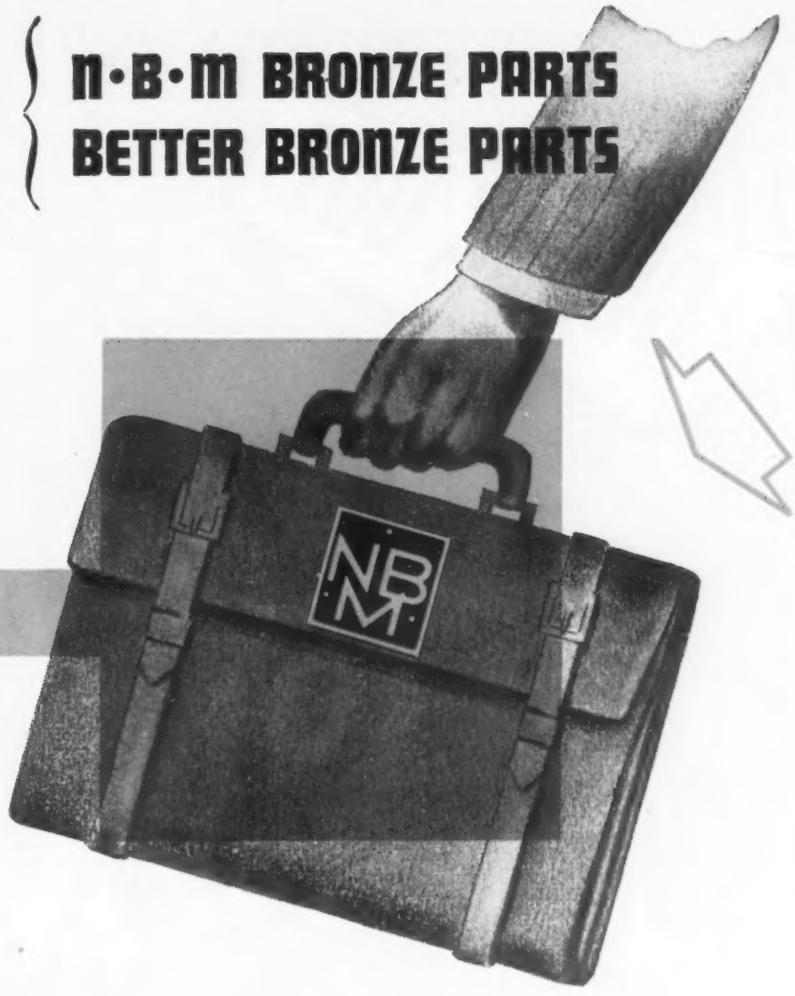
be Specific - say "Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

n·B·m BRONZE PARTS
BETTER BRONZE PARTS



CONSIDER THE N·B·M FIELD ENGINEER A MEMBER OF YOUR STAFF

When you're in a jam on bronze parts or bearings—call for a N-B-M "trouble-shooter"!

Our Field Engineers are always alert to help improve performance or solve technical problems for you.

N-B-M Field Engineers may have the answer to your bronze part problems. They will serve you whenever you need them.

N · B · M BRONZE PARTS
We put more service into them— you get more service out of them

NBM

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION
ST. LOUIS · NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

Chemically inert, bubble-free, adhesive to all metals, Kote-Masq is a *better* stop-off lacquer in every way.

It's compounded of a high polymer, in specially selected solvents. It comes to you ready to brush on or apply by dipping. Or you can dilute Kote-Masq for spraying, if you prefer. By *any* of these methods, two coats are all you need — with only a half-hour wait between. In final air-drying or baking, too, Kote-Masq sets fast and it won't contaminate plating solutions.

Try Kote-Masq. You'll quickly appreciate its superiority as a stop-off coating in either electroplating or anodizing solutions — acid or alkaline, hot or cold! Order a trial lot now. Kote-Masq comes in 5 Gal. and 1 Gal. cans, and 55 Gal. drums.

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

Plants: Matawan, New Jersey • Anderson, Indiana

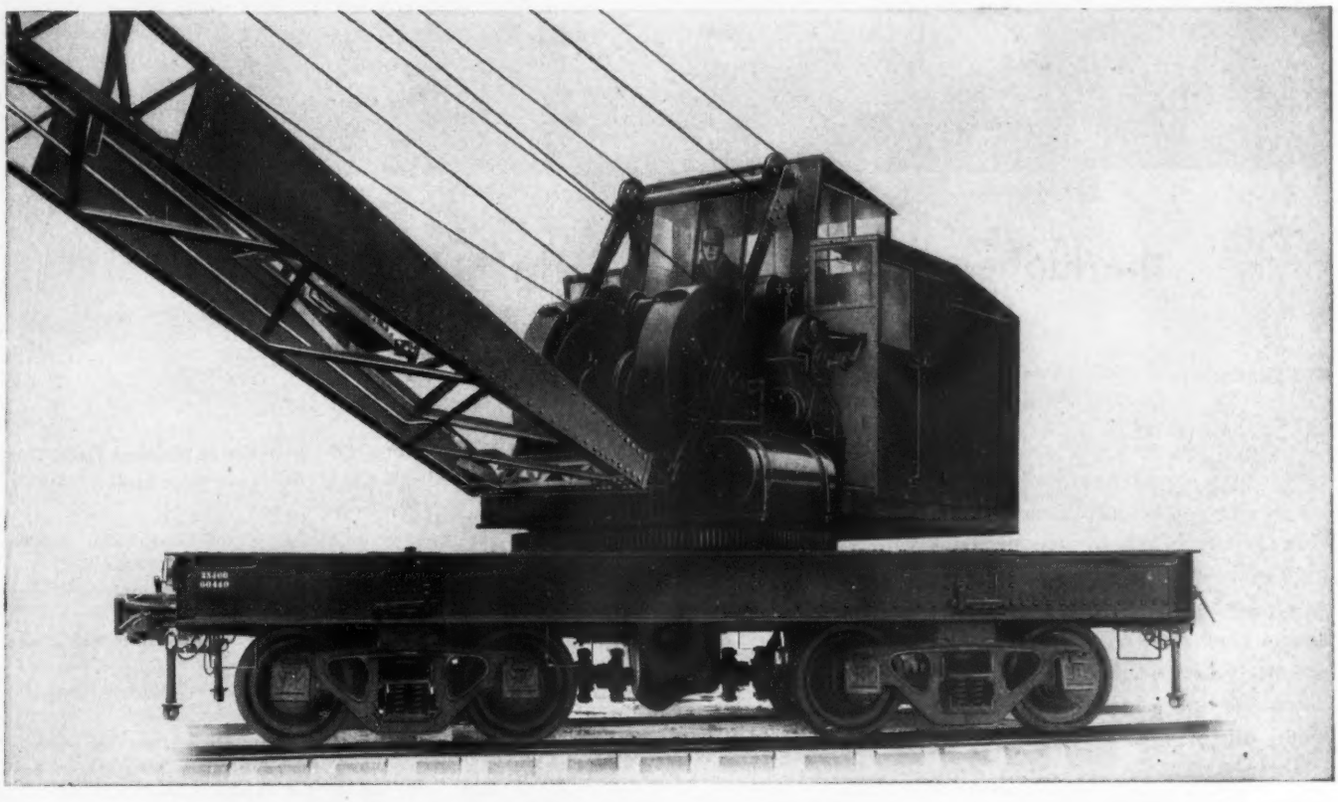
***Sales Offices:* Anderson • Chicago • Cleveland • Dayton • Detroit**
Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Syracuse

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A. · SINCE 1820

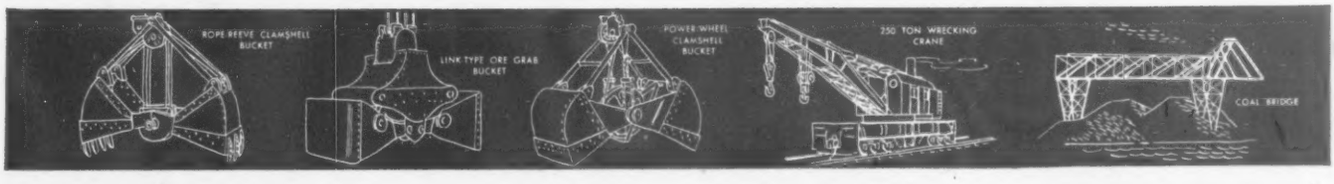
Smooth, easy swing

INDUSTRIAL BROWNHOIST CRANES SWING SMOOTHLY WITH AIR-OPERATED DOUBLE DISC FRICTION CLUTCHES

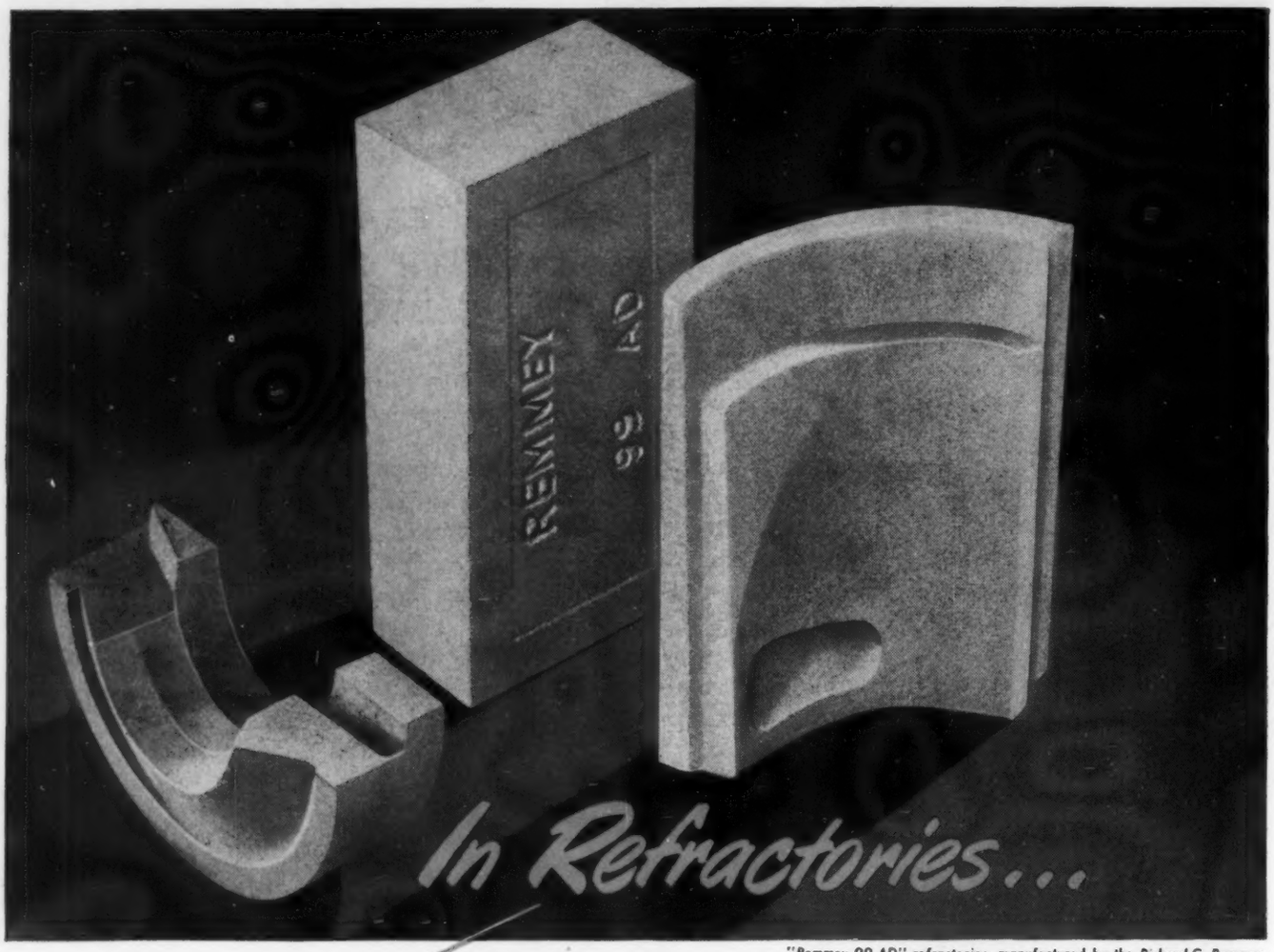
With a flick of the controls at his finger-tips, the operator of a BROWNHOIST crane swings the cab smoothly and easily. No sudden "grab" to make spotting of loads difficult, no jerking to cause loads to sway hazardously, no heavy grinding to cause abnormal wear . . . because air-operated double-disc friction clutches respond quickly, positively, to assure perfect control from start to stop. The BROWNHOIST crane operator also has the advantage of the patented Monitor-type cab that affords 360°—full circle—visibility, and other top-notch engineering and construction features including roller bearings at all essential points and one-piece cast steel bed with 14″ safety clearance between rotating bed and car body. These are just a few of the many reasons why you can depend on a BROWNHOIST crane for maximum efficiency in handling materials with hook, magnet, or bucket at lowest operating and maintenance costs. Write for full particulars.



BROWNHOIST BUILDS BETTER CRANES



INDUSTRIAL BROWNHOIST CORP. • BAY CITY, MICH. • District Offices: New York, Philadelphia, Cleveland, Chicago • Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B.C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec.



"Remmey 99 AD" refractories, manufactured by the Richard C Remmey Son Co., of Philadelphia, Pa., contain over 99% Alcoa Alumina.

the higher **THE ALCOA ALUMINA CONTENT,** the better the performance

Eliminate the weak spots! Refractory linings should not need replacing until they are worn out *all over*. But generally there are spots of high temperature, high abrasion and erosion that go first unless refractories made of ALCOA Aluminas are used for these tough locations. Then the lining life is equalized . . . wears out evenly.

Result: Fewer operation stoppages, fewer lining tear-downs . . . higher operating efficiency for the entire life of the refractory lining.

Leading refractory manufacturers can furnish refractory brick—"straights" and special shapes—made with ALCOA Alumina. These brick—used in kilns . . . metallurgical furnaces . . . glass tanks—cost more, but their longer life makes them the most economical brick you can buy for many applications. ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 1782 Gulf Bldg., Pittsburgh 19, Pennsylvania.

Put ALCOA Aluminas in the tough spots. They can take it. Refractory brick made of ALCOA Aluminas—

- Have higher strength and better stability under load at high temperatures.
- Have better resistance to spalling at high temperatures.
- Have better resistance to corrosive slags and gases.
- Reduce porosity and shrinkage to negligible factors.

These operating characteristics and the pyrometric cone equivalent (melting point) values increase as the ALCOA-Alumina content increases.

ALCOA ALUMINUM

ALCOA *Aluminas and Fluorides*

FORMERLY SOLD UNDER THE TRADE NAME "ALORCO"

WILSON ELECTRODES No. 98N and the No. 98N V&O
(A.W.S. Class. No. E 6010)

• These two reverse-polarity, arc-shielded electrodes are designed for easy operation in all positions.

• Because the deposit solidifies quickly, they are widely preferred by operators for use in vertical and overhead positions.

• Recommended especially for work where quality of weld is of prime importance.

• Dependable for producing flat-faced fillets in all positions.

• High burn-off rate gives an excellent deposition rate and fast welding speed.

• The Wilson No. 98N V&O is identical to No. 98N, except that a thinner coating makes it especially easy to handle in vertical and overhead positions.

• Further data on these and other electrodes in the Wilson line is contained in Catalog ADW-75. Fill in and mail the coupon and a copy of the catalog will be sent to you. If you prefer, address your nearest Wilson distributor.

WILSON

WILSON WELDER and METALS CO., INC.

General Offices: 60 East 42nd Street, New York 17, N. Y.

Distributed by: A M. CASTLE & COMPANY: Chicago, Seattle, Los Angeles, San Francisco; W. P. & R. S. MARS COMPANY: Duluth; KNIGHT & WALL COMPANY: Tampa; ARCOS CORPORATION: Philadelphia; Hartford, Conn.; THE CONGDON & CARPENTER COMPANY: Providence; H. BOKER & CO., INC.: New York, Cambridge, Mass.; GRAYBAR ELECTRIC CO., INC.: Pittsburgh, Cleveland, Cincinnati; HARRIS CALORIFIC SALES CO.: Detroit; PEABODY SUPPLY CO.: White City, Kans.

Represented Internationally by Airco Export Corporation

WILSON WELDER & METALS CO., INC. S
60 East 42nd Street
New York 17, N. Y.

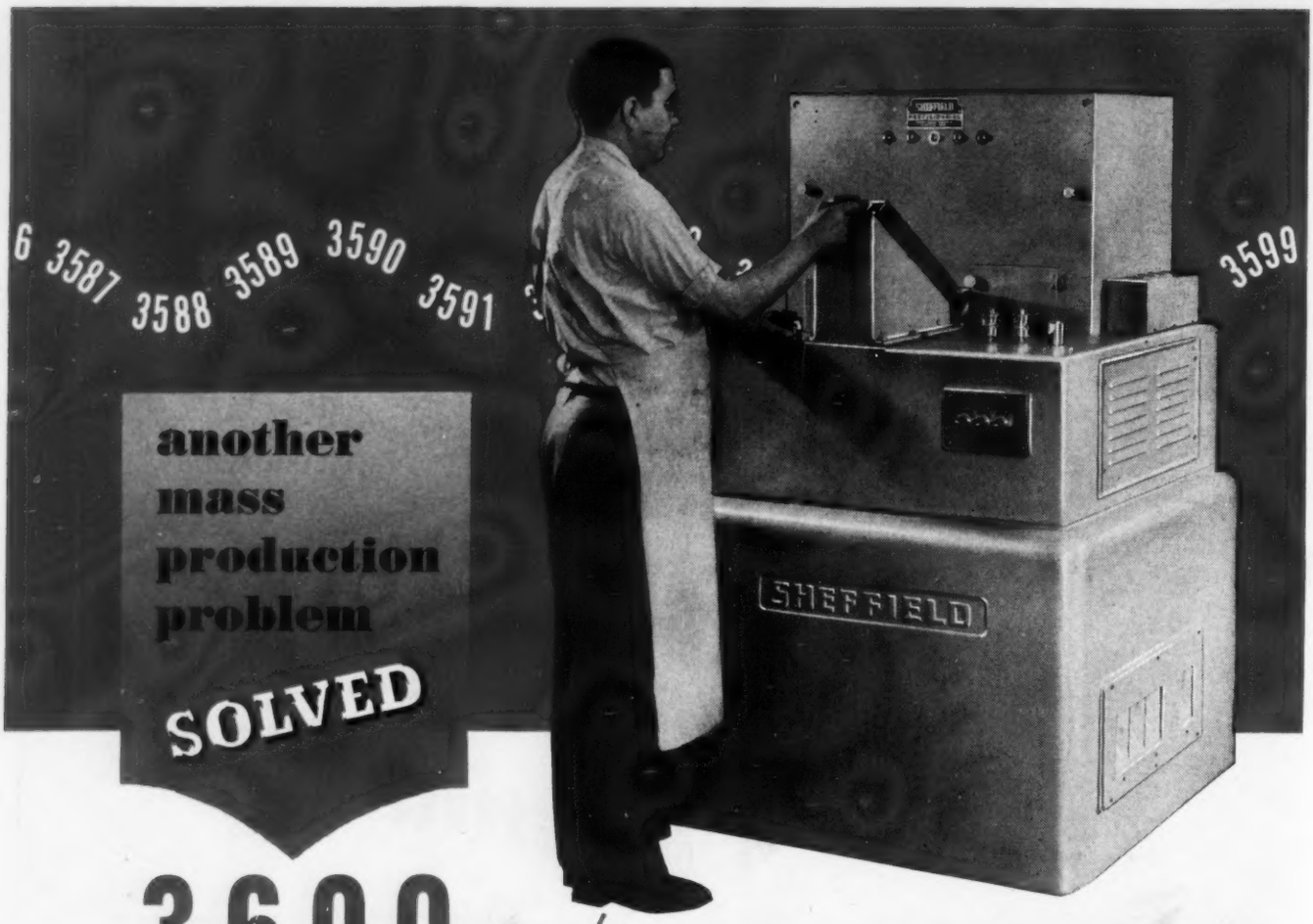
Please send me copy of Wilson Electrode Catalog No. ADW-75.
(II)

Name_____

Firm_____

Address_____

City_____ Zone____ State____



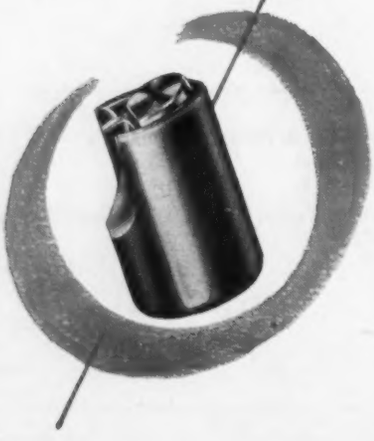
another mass production problem SOLVED

3600 *pistons classified per hour*

Shock absorber pistons come by conveyor from the centerless grinders to this Sheffield "Airlectric" Automatic Gaging Machine for inspection and dimensional classification.

The operator merely feeds the pistons into a chute. The "Airlectric" then automatically segregates undersize and oversize units. At the same time, those which fall within tolerance limits are separated into five classifications for subsequent selective assembly—and at the rate of 3600 units per hour.

If you require accurate inspection on large volume production, you can make material savings with machines similar to that described here. *Chek with Sheffield* on multiple and automatic gaging problems.



the *Sheffield* corporation

Dayton 1, Ohio U. S. A.

Standard Gages Shipped in 24 Hours

Sheffield MASTER CRAFTSMEN

2580

EDITORIAL STAFF

E. L. Shaner
Editor-in-Chief
Irwin H. Such
Editor
Wm. M. Rooney
News and Markets Editor
D. B. Wilkin
Engineering Editor
J. D. Knox
Steel Plant Editor
Guy Hubbard
Machine Tool Editor
Don S. Cadot
Art Editor
Allen G. Gray
Consulting Editor

ASSOCIATE EDITORS

W. J. Campbell • F. R. Briggs
Jay DeEulis • Vance Bell
Walter F. Toerge • John Parina Jr.

ASSISTANT EDITORS

H. C. Tuttle • Dolores K. Blaha
Henry J. Holtz • L. J. Skuderin
John S. Morgan • M. T. Borgerhoff

RESIDENT EDITORS

E. C. Kreutzberg
Washington Editor
T. N. Sandifer
Associate Editor, Washington
B. K. Price
Eastern Editor, New York
L. E. Browne
Associate Editor, New York
E. F. Ross
Chicago Editor
J. C. Sullivan
Pittsburgh Editor
A. H. Allen
Detroit Editor
Vincent Delport
European Editor, London

EDITORIAL CORRESPONDENTS

R. W. Kincey, *Birmingham*
L. C. Feldmann, *Buffalo*
Samuel S. Carr, *Cincinnati*
Mac Hutchens, *St. Louis*
George R. Reiss, *Youngstown*
Maurice Beam, *Los Angeles*
Robert Bottorff, *San Francisco*
R. C. Hill, *Seattle*
C. K. Cates, *Dallas*
F. S. Tobin, *Toronto*
J. A. Horton, *Birmingham, Eng.*
Leon Jaudoin, *Paris, France*

MAIN OFFICE

Penton Building, Cleveland 13, Ohio

BRANCH OFFICES

ew York 17.....16 East 43rd St.
hicago 11.....520 North Michigan Ave.
ittsburgh 19.....2800 Koppers Bldg.
Detroit 2.....6560 Cass Ave.
Washington 4.....956 National Press Bldg.
Angeles 4.....130 N. New Hampshire Ave.
don.....2 Caxton St., Westminster, S.W. 1

Business Staff on Page 4

NEXT WEEK . . .

High Heat Properties of Steels
6-Stage Progressive Die Operation
Coke and Iron Practice in Utah
Making Use of Investment Casting
Latest Lubrication Developments

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 15 APRIL 14, 1947

NEWS

★ As the Editor Views the News 53
Government Uses "Moral Suasion" To Lower Prices 57
Auto Industry Holds First Place as Steel Consumer in December 58
Sheet, Strip Shipments in January at Annual Rate of 17,190,000 Tons 59
★ Present, Past and Pending 59
Steel Wage Negotiations Lagging 60
Rolling Mills—Already Installed or Scheduled for Early Completion 61
Fontana Freight Not Included in ICC Rate Study 62
West Coast Steel Shortages Limit Fabricators' Activity 62
Substantial Rise in New Companies Noted in Texas 63
Surplus Machine Tool Sales Are at Slower Pace 64
Proposal To Raise Freight Rates on Lcl Steel Shipments Opposed 65
★ Windows of Washington 66
Belgium To Ship Steel to Britain: Germany Exports Industrial Products 69
India Contemplates Steel Expansion To Raise Capacity to 3 Million Tons 70
Forging Company's Plant Hospital Provides Modern Medical Service 71
★ Mirrors of Motordom 73
Sharon Steel Forms New Tube, Strip Subsidiary 76
★ Briefs 77
★ The Business Trend 78
★ Men of Industry 80
★ Obituaries 85
★ Construction and Enterprise 176

TECHNICAL

Vacuum Melting and Casting 86
Streamlining Industrial Methods 89
Fluid Punch Draws Sheet Metal in One Operation 90
Fundamentals of Carburization and Decarburization of Steel 92
Mechanized Soft Soldering 98
★ Engineering News at a Glance 100
Assembling Electric Locomotives 105
★ Progress in Steelmaking—Economy in Electric Arc Furnace Operation 108
"Fluid Storage" of Bar Stock 113
Relocation of Plant Equipment Pays High Dividends 114
Generating 44-Inch Pinions 120
3 and 1 Broaching on One Dual-Ram Machine 123
★ New Literature 126
★ New Products and Equipment 147
★ Helpful Literature 151

MARKETS

Steel Labor Trouble Feared as Negotiations Stall 153
★ Market Prices and Composites 154
Nonferrous Metal Prices Hold Steady 158

★ *Index to Advertisers* 184

★—Denotes regular features.

It's Gotta Fit...

DEPENDABLE DAN
Our Customers' Man

TURN IN MORE SCRAP — HELP TURN OUT MORE STEEL

IT MUST FIT YOUR JOB

RELIANCE

JOB-FITTED STEEL

Best fitted to do a specific job for a specific customer at a specific time — and all factors considered, at lowest cost.

RELIANCE STEEL DIVISION

Detroit Steel Corporation

GENERAL OFFICES: 1025 SOUTH OAKWOOD AVE., DETROIT 9, MICH.

PLANTS: CHICAGO*, CLEVELAND*, DETROIT*, LYNDHURST, N. J., WORCESTER, MASS.

SALES OFFICES: GRAND RAPIDS,* INDIANAPOLIS*, NEW HAVEN, PHILADELPHIA*, ST. LOUIS, TOLEDO*

ALUMINUM SHEETS and STRIP—available through locations marked

PRODUCTS

•

SHEETS
Hot Rolled
Hot Rolled Pickled
Cold Rolled
Long Terne
Galvanized

•

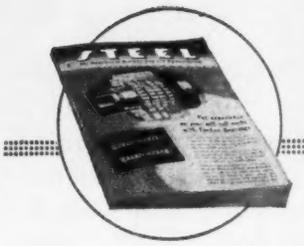
PLATES

•

COLD ROLLED STRIP STEEL
Coils and Cut Lengths, Slit or Round Edge
All Tempers

•

ALUMINUM*
Sheets and Strip



April 14, 1947

Ford's Decision

Henry Ford made many vital decisions during his eventful career, but none was more important than one he made in 1902.

Mr. Ford had worked as an engineer for the Detroit Edison Co., using his spare time to develop an automobile in a shed back of his house. By 1899, after building several cars, he believed he had acquired sufficient experience to go into automobile building on a commercial basis. He quit his job with Detroit Edison and became chief engineer of the Detroit Automobile Co., in which he held a small stock interest. This company turned out custom-built cars. Ford was obsessed with the idea that automobiles should be manufactured in quantity, which would reduce the cost and enlarge the market. In 1902, after the directors of the Detroit Automobile Co. had persistently maintained that the company should produce vehicles only on the order of customers, he resigned.

Resuming his experiments in a rented workshop, he built several cars, one of which won every race it entered. Partly on the strength of the prestige of this performance, Ford in 1903 established the Ford Motor Co. During the ensuing five years, several models were built and sold. On Oct. 1, 1908, the first of the famous Model T cars made its appearance. It was priced at $850. In spite of the great popularity of this model, it was not until seven years later, on Dec. 10, 1915, that the millionth Model T was turned out.

However, the Ford conception of mass production was working miracles. In 1926, when wages were four times those paid when the first million Model T's were being built, when materials cost twice as much, and when the selling price was only $310, Ford Motor turned out two million cars.

Here was convincing and spectacular evidence that Ford's idea of a "universal car"—of identical products manufactured in great quantity at low cost for mass markets—was sound. It commanded the attention of industrialists all over the world. It paved the way for mass production, not only in the automobile industry, but in many other fields where the potential market was large enough to justify the Ford formula.

Henry Ford's decision in 1902 to escape the "custom-built" restriction of his directors was momentous. It freed him to pace American industry in the development of a technique of manufacture that has revolutionized the economy of all civilized nations.

The world long will feel the imprint of his genius.

* * *

THREAT AND PROMISE: Seldom has the problem of commodity prices been as complicated as it is today. With few exceptions, everybody who has a reasonable grasp of the situation agrees that for the good of the economy, the present upward trend in prices should be reversed and that they should start going downward in as orderly a fashion as may be possible.

Although there is almost unanimous agreement on this, there are widespread differences of opinion as to how it may be accomplished. For one thing, many prices are farther out of line than others. Also some companies in a given field can reduce prices easier than can some of their competitors.

Apparently President Truman thinks that those who are in advantageous positions to reduce prices should do so as as an example for others. At a press conference last week he told newsmen that responsibility for price reductions rests squarely upon the shoulders of the nation's businessmen. "They wanted free enterprise," he said. "Now let's see them make it work."

This is an implied threat and promise at the same time. The threat is that if businessmen can't

(OVER)

handle the price problem under "moral suasion," public opinion may demand a re-imposition of price controls. The promise is that if business can make free enterprise work, it can expect less bureaucratic meddling on the part of government. —p. 57

• • •

STALEMATES IN LABOR: Signs of uneasiness over lagging wage negotiations are mounting. Although the extensions of old contracts between steel workers and employers expire in about two weeks, conferences between the principals seem to be making little or no progress.

Employers have at least two valid reasons for exercising extreme caution. In spite of the fact the Mt. Clemens Pottery Co. case which started the portal pay furore has been thrown out of the courts forever, employers as yet have no reliable information as to the extent of their liability under pending portal wage suits.

A second disturbing factor is the inability of Congress to indicate clearly what corrective labor legislation it will enact.

Until these two uncertainties are clarified, it will be difficult for negotiators to work out new contracts intelligently or in good faith. It would seem that either Congress must show a burst of speed or further extensions of contracts will be in order. —p. 60

• • •

MORE STEEL IN SIGHT: List of 56 rolling mills recently installed or scheduled for early completion will interest producers and consumers of finished steel for several reasons.

Customers, particularly, will be quick to note the estimated dates when the mills will be completed. They will find comfort in the fact that of the 56 mills listed, 31 are in operation or are scheduled for completion before the end of the third quarter of the current year.

Another significant point in regard to this list is the preponderance of mills that will increase the capacity for rolling flat-rolled steel products. The list includes 19 continuous cold strip mills, 6 hot strip mills and 11 skin or temper pass mills—a total of 36 for flat-rolled steel products. Of these, 21 are in operation or scheduled for completion before the end of the third quarter.

This schedule should lend encouragement to manufacturers who have had difficulty in obtaining steel. —p. 61

SIGNS OF THE TIMES: Hit hardest by the freakish coal mine situation (p. 60) are the railroads and steelmakers operating blast furnaces in close proximity to the coal fields. . . . Of 17,000 foreign students now attending American universities, 3133 are enrolled in engineering courses. Of these engineering students (p. 68), 937 come from countries in the Far East, including 300 from China, 287 from India, 178 from Turkey and smaller numbers from Egypt, Iran, Greece, the Philippines, Iraq and Afghanistan. . . . State Planning Committee of the U.S.S.R. is reported to have planned for the construction in 1947 (p. 69) of 38 blast furnaces, 100 open-hearth furnaces and 54 batteries of coke ovens. . . . A Buffalo company has developed a method of drawing and embossing sheet metal whereby water under high pressure is substituted for the conventional male die. Only one die is used (p. 90), the water "bulging" the metal to the recessed contours of the female die. . . . A seven-year steel expansion program to increase India's annual steelmaking capacity from about 1,200,000 to 3 million tons (p. 70) has been recommended to the government by the Iron & Steel Panel. . . . Reduction of prices of Plymouth automobiles in amounts from $25 to $55 focuses attention upon the jockeying by General Motors, Ford and Chrysler (p. 74) for advantageous positions in the low-price field as the period of normal competition approaches. . . . Annual report of Aluminum Co. of America brings out the fact that in the shipments of ferrous and nonferrous metals in the United States in 1946 (p. 71), the tonnage of aluminum was second only to that of iron and steel. . . . Hand-soldering seams on 20-gage steel boxes was a production bottleneck in the manufacture of air conditioning units (p. 98) until the operation was mechanized by conveying the boxes at predetermined speed under fluxing brush, oxyacetylene flame and solder feed. . . . 53 per cent of 268 general contractors polled by F. W. Dodge Corp. (p. 78) believe that prices in the construction industry have reached their peak. In New England, South Atlantic and East South Central states opinion was preponderant that costs had attained their crest. In the Pacific states, opinion was general that construction prices will continue to rise. . . . . Producers of bolts and nuts, wire, chain, nails and other items are protesting vigorously proposal of railroads (p. 65) to increase freight rates on less than carload shipments of steel in "official territory."

E. L. Shaner

EDITOR-IN-CHIEF

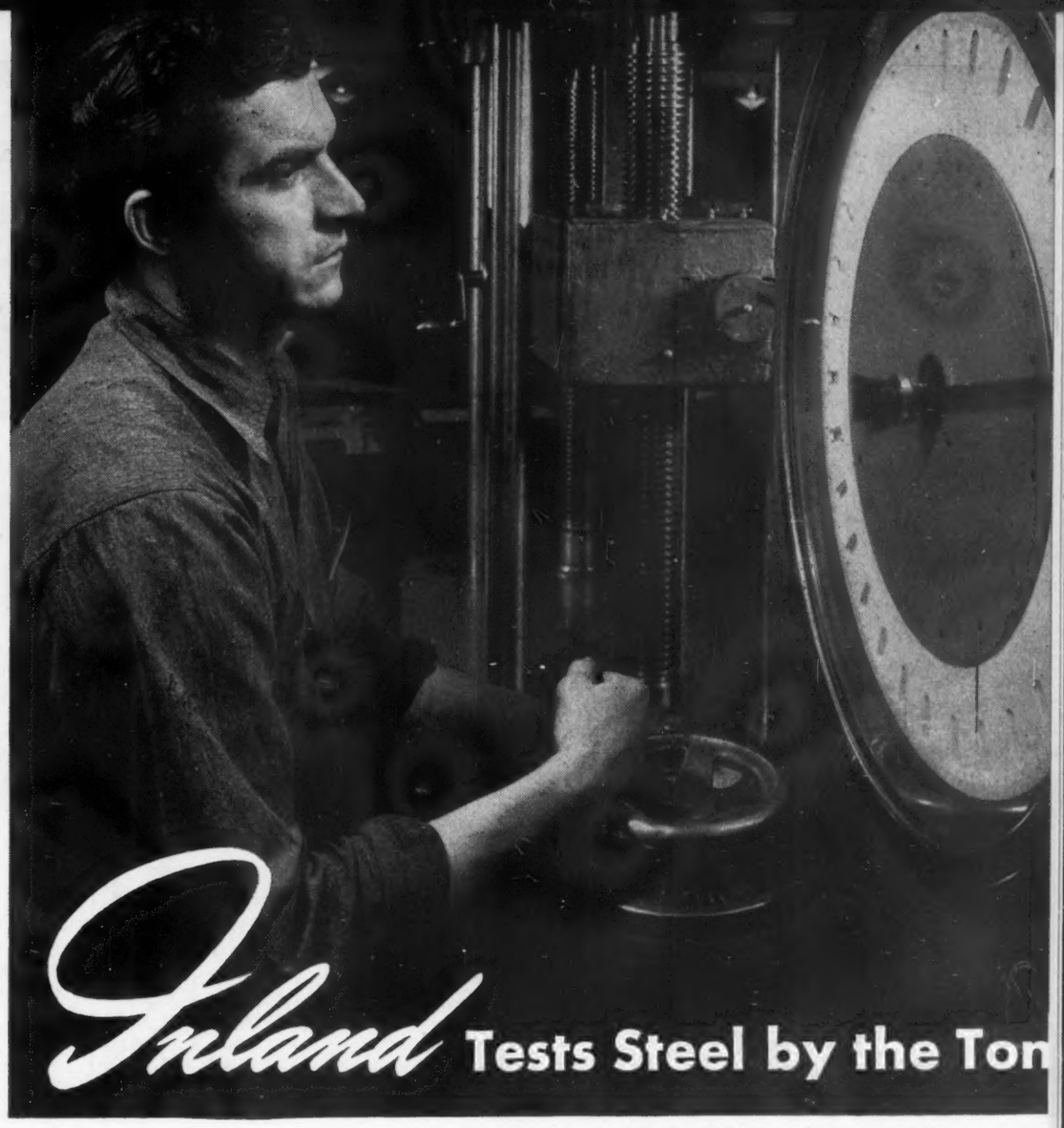
Special duty trucks gather steel samples for the laboratory.

A truck is unloaded at the laboratory, and immediately starts another round trip.

Plate samples are punched to rough form, then milled. Others are sawed, turned, drilled etc., as required.

Many samples undergo rigid chemical tests.

Metallurgical tests are extremely important for quality control.



Inland Tests Steel by the Ton

Operator determining physical properties on one of the many tensile testing machines in the Inland laboratory.

Darting from mill building to mill building—many times a day, and at night—are Inland trucks on special duty, a duty of vital interest to every user of Inland steel.

They are the sample trucks which rush samples of Inland products to the main laboratory where all required tests must be completed, reported and checked against specifications before steel is shipped.

Samples are gathered for the laboratory at semi-finishing mills—pieces from billets, slabs, etc., that will be tested before the steel is rolled into final form. Also collected are samples of finished products. Depending upon requirements, every piece of steel delivered to the Inland laboratory undergoes rigid physical, chemical, and metallurgical tests. Many of these tests are special developments by Inland—tests that are fast and extremely accurate.

Yes, Inland daily tests tons and tons of steel to assure every customer that his order will measure up to every requirement.

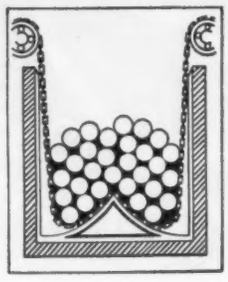
Bars • Floor Plate • Piling • Plates • Rails • Reinforcing Bars • Sheets
Strip • Structurals • Tin Plate • Track Accessories

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Sales Offices: **Detroit • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul**

A "Sweet" Pickler



MONEL CHAINS *in the Weldco mechanical pickler move up and down alternately, revolving stock and exposing all surfaces. At left, Monel "spreader" which helps revolve load, crack oxide scale and increase agitation. Sprockets, chain, and tank trim are also Monel.* (*Fabricated by* Youngstown Welding & Engineering Company, Youngstown, O.)

● You've seen mechanical picklers before.

But have you come across one with all the features of this *Weldco* job?

Developed by the YOUNGSTOWN WELDING AND ENGINEERING COMPANY, Youngstown, Ohio, it handles everything from bars, flats and tubes to rounds, squares and hexagons. Automatically raises and lowers up to 10-ton loads at whatever speed you set. Cuts pickling time as much as 40 to 60 per cent.

Yet that's only the beginning. The *Weldco* mechanical pickler saves steam, acid, labor and maintenance besides.

Take the "spreader," a device that breaks up the load and makes it roll. This not only increases agitation, but also helps crack oxide scale. You get *faster* pickling . . . uniform action on *all* surfaces . . . reduce over-pickling . . . save steel.

The spreader – like all exposed parts of Youngstown's Weldco mechanical pickler – is made of Monel*. Experienced pickling room men know the *additional* savings that Monel makes possible.

For Monel withstands attack by hot sulfuric acid and other pickling solutions in common use by steel mills. It retains its high strength and resistance to corrosion. It assures more continuous operation . . . requires less time out for repairs.

You get these advantages, too, when you specify Monel for crates, racks, baskets, hooks, chain and accessories. Whether you measure loads in pounds or tons . . . whether you pickle sheets, tubes or castings, tiny screw machine products or heavy stampings . . . *Monel is the practical, economical metal for the job.*

Monel*

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

NICKEL (INCO TRADE MARK) ALLOYS

MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • NICKEL • "KR"* MONEL
INCONEL* • "Z"* NICKEL • "L"* NICKEL

*Reg. U. S. Pat. Off.

Government Uses "Moral Suasion" To Lower Prices

Drive for downward price adjustments highlighted by special meeting of President Truman's cabinet at which economic conditions were discussed. Steel price cut hinges on wages

With steel production establishing peacetime records the administration is attempting to persuade producers to lower prices. At right, open hearth furnace releases 150 tons of steel

PSYCHOLOGICAL pressure by the government for lower prices reached fever pitch last week as President Truman's cabinet met in extraordinary session to discuss the economic situation, especially as it concerns prices.

In addition to the cabinet, members of the President's Council of Economic Advisers, headed by Edwin G. Nourse, Chairman Marriner Eccles of the Federal Reserve Board, Budget Director Webb and General Philip B. Fleming, chief of the Office of Temporary Controls, attended the session which lasted an hour and forty-five minutes.

President Truman told newsmen at his first press conference following the cabinet meeting that responsibility for price reductions rests squarely with the nation's businessmen. They wanted free enterprise, said Mr. Truman. Now let's see them make it work.

The Chief Executive denied re-imposition of price controls was being considered. He emphasized that only "moral suasion" can be used to bring about the reductions.

Asked whether he felt further price increases would justify new wage increases, the President replied that further wage increases would be justified if prices don't come down.

Import of the meeting was not readily apparent. Coming after weeks in which the pressure has been increasingly applied on business and industry for a reversal of the price trend, it appeared to be but another step aimed at dramatizing the seriousness of the inflationary movement and the need for quick correction if serious economic trouble is to be avoided.

President Truman and other government officials have expressed increasing concern in recent weeks over the price situation. Within the past ten days or so this concern appears to have been heightened by recurrence of labor trouble in the coal mines and the telephone industry, and growing threat of work interruptions in the steel and automotive industries in the near future unless substantial wage advances are forthcoming.

Attention Centers on Steel

The question of steel prices has been paramount in Washington discussions in recent weeks. It was stated by Presidential Secretary Ross that last week's cabinet meeting did not specifically take the steel price situation into consideration, though steel may have been mentioned in the general discussion. Actually, the question of an immediate steel price reduction at this time would seem to have been ruled out by the recent statement of Benjamin Fairless, president, United States Steel Corp., that his company could not give any consideration to price policy until the question of wages, now being negotiated with the United Steelworkers of America, had been disposed of.

As a general thing the view is held that Mr. Fairless' statement did not eliminate the possibility of an early price reduction. It simply emphasized the relationship of prices to wages. Settlement of the wage question, it is said, must come before producers can act on prices. In any event, the hope is held in government circles of a steel price reduction which it is felt would be a strong influence in stemming the inflationary tide. Trade observers are of the opinion at least a token cut of $1 to $2 per ton in base prices is not unlikely, especially should first quarter steel industry earnings prove substantially greater than in the last quarter of 1946.

That, of course, is looking at it from the near-term. From the long-term, steel market observers are of the view downward price adjustments in steel are likely later in the year on some products when supply and demand come into balance. Currently, producers are adjusting extra cards to conform with recent changes effected by Carnegie-Illinois Steel Corp.

Ultimate effect on steel prices of the recent break in the scrap market is uncertain. Last week scrap continued to ease off but the movement downward was so orderly, and so little new buying was being done, it was difficult to determine whether a further substantial

decline in this market is in immediate prospect.

On another front, the "gray" market in steel is under increasing pressure. Recent resistance of buyers to brokers' high-priced offers is reported to have brought about some sharp cuts in offering prices. As a matter of fact, some observers are of the opinion offerings in this market are drying up, with consumers pressing for elimination of fly-by-night operations. Last week two congressional investigations of the "gray" market in steel were launched, one by the House Small Business Committee and the other by the Senate Small Business Committee. They are the outgrowth of complaints from small businessmen throughout the country to the effect that they cannot get steel, or that they are being asked to pay outrageous premium prices.

First to get into action is the Senate group which has appointed a Steel Subcommittee, which will open hearings April 15.

The House committee proposes to investigate the premiums being asked by steel merchants and proposes to find out where the dealers asking the premiums for getting their steel. The House committee wants to determine particularly, whether steel merchants are violating the Robinson-Patman Act by charging some consumers higher prices than other buyers.

Auto Industry Holds First Place As Steel Consumer In December

THE AUTOMOTIVE industry continued through December in first place as a consumer of finished steel products, the latest distribution report by the American Iron & Steel Institute shows.

In retaining the lead, the automotive industry, excluding tractors, received 578,987 net tons, or 12.8 per cent, of the month's total distribution of 4,517,463 net tons. That was a decrease from November, when manufacturers of automobiles, trucks, parts and accessories received 658,953 net tons, or 13.1 per cent, of the total distribution of 5,000,377 net tons.

Rising from fourth place to second was the container industry, which in December received 381,604 net tons of finished steel. Moving down a notch were construction and maintenance, and rail transportation, the former classification ranking third in December by receiving 378,940 net tons and the latter placing fourth with 341,670 net tons.

Steel warehouses received less tonnage in December than in November, but inasmuch as total distribution in December was less than in the preceding month, the percentage allotted to warehouses remained unchanged, 16.2 per cent. Warehouse receipts in December totaled 733,370 net tons, compared with 810,221 net tons in November.

January Shipments of Wire Products at High Levels

Shipments of wire nails and staples during January at 77,480 net tons set a record, according to the American Iron & Steel Institute. That rate was equivalent to annual shipments of over 910,000 tons, exceeding all previous peacetime and wartime rates.

Shipments of bale ties at 9810 tons in January were also at a record annual rate. That rate of shipments was the equivalent of 115,000 tons of bale ties annually, as compared with the wartime high of 106,408 tons produced for sale in 1942.

Canada Fails To Lift Price Controls from Basic Steel

Controls and ceiling prices have been discontinued by the Canadian Wartime Prices & Trade Board on a long list of items including automobiles, household goods, refrigerators, ranges and bicycles, but the list did not include iron and steel. Named on the roll of controlled articles

Distribution of Steel Products—December, 1946

(In net tons of leading products of all grades of steel, including alloy and stainless)

Market Classification	Shapes	Plates	Hot Rolled Bars	Cold Finished Bars	Seamless Tubing	Drawn Wire	Hot Rolled Sheets	Cold Rolled Sheets	Coated Sheets	Hot Rolled Strip	Cold Rolled Strip	Total (All Products)
Converting and Processing	8,714	41,959	166,788	12,602	10,064	77,238	61,495	1,916	375	29,816	8,847	732,642
Jobbers, Dealers, Distributors	59,419	59,742	79,360	43,399	69,973	13,911	62,200	29,304	32,638	11,257	4,147	733,370
Construction, Maintenance	120,177	81,532	24,425	149	15,439	774	23,031	2,918	15,124	5,126	1,295	378,940
Contractors' Products	815	9,865	11,408	686	3,744	2,088	49,541	27,430	28,689	8,269	5,560	161,977
Automotive, excl. Tractors	2,683	20,933	111,950	20,777	1,629	18,177	138,318	173,433	7,797	35,691	23,189	578,987
Rail Transportation	41,640	48,052	29,082	1,214	748	237	22,178	1,411	2,162	2,098	486	341,670
Shipbuilding	2,966	11,647	953	118	20	74	1,122	125	1,197	112	.....	18,668
Aircraft	.....	330	315	659	91	16	618	202	73	596	223	3,364
Oil, Gas Drilling	2,506	5,819	5,568	559	5,802	10	1,424	.....	37	26	91	27,158
Mining, Quarrying, Lumbering	1,156	2,161	3,695	246	22	77	1,211	257	71	91	7	13,816
Agricultural	3,082	4,666	35,132	4,403	67	2,616	8,705	3,786	8,320	6,219	614	83,076
Machinery, Industrial Equipment, Tools	16,791	40,017	56,004	22,351	8,390	7,952	21,272	5,193	1,238	11,342	5,074	215,322
Elec. Mach., Equipment	1,723	6,152	8,018	3,519	83	3,376	29,444	7,936	2,195	6,713	5,095	116,994
Appliance, Utensils, Cutlery	119	1,246	1,851	2,511	582	3,981	15,325	41,612	6,797	4,175	5,676	104,461
Other Domestic, Commercial Equipment	930	4,617	5,809	4,174	234	23,637	18,443	31,140	5,317	8,663	12,541	125,750
Containers	2	12,958	2,293	.....	737	7,381	49,019	19,903	3,215	12,835	10,842	381,604
Ordnance, Other Military	.....	161	744	125	.....	3	35	10	.....	.....	201	3,122
Unclassified	24,582	15,131	86,396	23,765	44,928	35,996	44,256	26,168	9,909	4,137	37,910	573,019
Export	22,265	27,168	25,064	3,362	15,788	8,467	17,717	8,082	5,341	5,976	1,008	260,267
Total	309,570	394,156	654,855	144,619	178,341	206,011	565,354	380,826	130,495	153,142	122,806	4,854,207
*Less shipment to members of industry for conversion	41	7,731	70,226	309	9,728	8,752	38,469	118	8	18,608	2,074	336,744
Net Total	309,529	386,425	584,629	144,310	168,613	197,259	526,885	380,708	130,487	134,533	120,732	4,517,463

* All of these shipments were made to the group classified as "Converting and Processing."

are basic iron and steel products and alloys; including pig iron, cast iron, scrap, ingots, bars, plate, rods and wire; primary, secondary and fabricated mill forms of nonferrous metals, and their alloys.

Employment in Cleveland Almost Reaches War Level

Cleveland industrial employment is holding firm at a level almost equalling that just prior to V-J Day, the Cleveland Chamber of Commerce survey of employment for March indicates. On the basis of the survey, it is estimated that over 220,000 hourly-paid employees work in Cuyahoga county.

The outlook for April is favorable, the chamber says with 19 representative companies expecting further hirings.

The general wage trend is still upward, and at the end of March the average hiring rate for common labor registered an all-time high of 90.5 cents an hour.

Steel Output at Peacetime High in First Quarter

Steel ingot production in the first quarter established a new peacetime record with a total of 20,919,055 tons, almost double the output in the first quarter of 1946, according to the American Iron & Steel Institute.

March production, at 7,284,516 tons, also set a peacetime record, surpassing the output of January this year.

Sustained high operating levels during the remainder of 1947 would result in approximately 85 million tons for the year, or 19 million tons higher in 1946.

March production breaks down as follows: Open hearth, 6,622,839 tons, 96.2 per cent of capacity; bessemer, 378,781 tons, 86.5 per cent; electric steel, 282,896 tons, 65.5 per cent; total 7,284,516, 94.1 per cent of capacity. Calculated weekly production was 1,644,360 tons on the basis of 4.43 weeks in month.

First quarter breakdown: Open hearth, 18,998,051 tons, 95.1 per cent; bessemer, 1,077,589 tons, 84.8 per cent; electric, 843,415 tons, 67.4 per cent; total, 20,919,055 tons, 93 per cent. Calculated weekly production was 1,626,676 tons.

Lump Ore Replaces Scrap in Open Hearths

Up to 13 per cent of the weight of purchased scrap in open hearths is now being replaced by iron derived from lump ore, according to the American Iron & Steel Institute. One lb of coke is required for every 3 lb of ore to promote necessary chemical reaction. Because of the use of this extra amount of cold material, the melting time is increased about 4 per cent.

Sheet and Strip Shipments in January at Rate Equal to 17,190,000 Tons Annually

SHIPMENTS of hot and cold-rolled sheet and strip during January totaled 1,460,389 tons, equivalent to an annual rate of 17,190,000 net tons, according to the American Iron & Steel Institute. That annual rate is about 1 million tons larger than the 16,165,000 net tons shipped in the 1941 record year.

Total amount of finished steel of all types shipped by the steel industry during January was 5,030,000 net tons.

January shipments of hot and cold-rolled sheet and strip represented 29 per cent of all the finished steel shipped during that month. This means that the flat-rolled products comprised as large a ratio of steel shipped as the 1946 average which topped every year since 1940. In 1940, this ratio was 27 per cent, and in 1941 it was 26 per cent.

In January, hot-rolled sheet and strip shipments were 50.6 per cent of total shipments of hot and cold-rolled sheets and strip. This compares with an average of 48.7 per cent for the entire year 1946.

Of the January sheet and strip shipments, hot-rolled sheets comprised 593,560 net tons, cold-rolled sheets 416,089 net tons, galvanized sheets 139,794 net tons, and electrical and enameling sheets 49,739 net tons. In addition, 145,600 net tons of hot-rolled strip and 115,607 net tons of cold-rolled strip were shipped.

Present, Past and Pending

■ COLD BAR COMPANY FORMED AT CAMDEN

CAMDEN, N. J.—Precision Drawn Steel Co. Inc. has been incorporated and is building and equipping a 50,000 sq ft plant at 3600 River Road for cold finishing steel bars in a full range of sizes and special shapes. Capacity will be 50,000 tons annually. Principals are: Ralph Cornell, chairman; Paul W. Newcomb, president; Henry J. Bauman, vice president and general manager.

■ NEW CUBAN CHROME REFRACTORY ANNOUNCED

CLEVELAND—A new air-emplaced refractory, known as Gunchrome, utilizing Cuban chrome ore as a base and designed to facilitate maintenance and repair of open hearth furnace interiors, has been announced by Basic Refractories Inc. Company also has developed a new type gun which feeds the refractory to specific spots on the wall of the furnace at a rate of more than 100 lb a minute.

■ STEEL'S TRANSPORTATION BILL: $872,515,000

NEW YORK—Transportation charges on the iron and steel industry's raw materials and finished products during 1944, a record year, totaled $872,515,000, according to a study by the American Iron & Steel Institute. Of the total, $464,118,000 represented charges on outgoing products from the mills and $508,397,000 charges on incoming shipments of raw materials and supplies.

■ MANUFACTURERS' INVENTORIES RISE $300 MILLION

WASHINGTON—Manufacturers' inventories increased $300 million during February to a total of $21 billion, a new high, according to the Department of Commerce.

■ FILM DESIGNED TO SPEED FREIGHT CAR LOADING

NEW YORK—United States Steel Corp. through its subsidiary, Carnegie-Illinois Steel Corp., has produced a new sound slide film, "Highballing," which explains how industrial shippers can co-operate in combatting the freight car shortage by faster loading and unloading.

■ SUBSTANTIAL TUNGSTEN DISCOVERY REPORTED

NEW YORK—Tungsten Mining Corp., jointly owned by General Electric Co. and Haile Mines Inc., reports discovery of "substantial" tungsten values at 750-ft depth in Vance county, North Carolina.

■ CHEVROLET PRODUCES MILLIONTH POSTWAR CAR

DETROIT—Chevrolet Motor Division of General Motors last week became the first automotive unit to produce a million vehicles since the end of the war.

Steel Wage Negotiations Lagging

Unionists hint strike if new contract is not agreed upon by Apr. 30. Murray calls Wage Policy Committee and Executive Board

PROBE DISASTER: A group of members of the Illinois state legislative investigating committee appointed to study the Centralia mine disaster don miners' outfits before descending into the pit at No. 5 mine where 111 men lost their lives. NEA Photo

PROSPECTS for continued high industrial production are becoming clouded by uncertainties in the labor situation. Particularly alarming are the lack of progress in the steel wage negotiations and the continued low coal output as result of John L. Lewis' "safety strike."

While the mine safety strike appeared to be petering out late last week as the miners drifted back to work in many areas, the outlook is unfavorable for early resumption of coal production at the near-record levels of the first quarter.

Industrial coal stocks, which averaged 33 days' supply at the beginning of March, have failed to gain appreciably during the winter months despite the high coal output, which during the first three months this year averaged 2,163,000 tons daily. A high rate of industry, utility and railroad operations have been holding industrial consumption at around 40 million tons monthly.

Continued idleness of any substantial number of mines soon will be reflected in industrial operations.

Uneasiness Is Increasing

Uneasiness over the lack of progress made in steel wage negotiations between steel producers and the United Steelworkers of America is increasing. Practically no progress has been made by negotiators over the past two months and the wage question has not yet come up for consideration. The contract extension agreed to by the union and the producing companies expires Apr. 30.

In union circles, talk is heard of a strike starting in early May unless there is a quick change for the better in the wage negotiations. Philip Murray, president of the Steelworkers' union and of the CIO, has called a meeting of his Executive Board for Apr. 19 and 20 and of the general Wage Policy Committee on Apr. 21 in connection with the current steel wage negotiations.

Uncertainty as to the companies' liability under the portal pay suits has been the major deterrent to progress of wage negotiations. This uncertainty was the basis for the original 10-week extension of the contract and it was hoped that by this time Congress would have finally legislated the portal pay issue out of existence.

Exactly what has been happening in the many conferences between union negotiators and representatives of the various steel producers has been hidden by a self-imposed censorshp by both union and management. Neither side, however, claims any considerable actual progress has been made, even on the non-economic demands of the union.

Some of the negotiators are said to feel that they have reached a "very bad situation" in which "something has to be done." A union spokesman says with the large areas of disagreement still existing it will be extremely difficult to cram the work of negotiating a contract into the short time remaining.

The delay in agreeing upon a new steel wage contract is holding up negotiations in other industries which want to know what the steel wage settlement will be before committing themselves to new contracts.

Meanwhile, the original portal pay suit which started all the furore, the famous Mt. Clemens Pottery Co. case, has been thrown out of the courts forever. Action was taken by the Sixth Federal Circuit Court of Appeals in Cincinnati which dismissed "with prejudice" an appeal of employees from an adverse lower court decision.

The extent to which John L. Lewis' safety strike would continue to hinder coal production was difficult to judge last week. Early in the week a back-to-work movement developed in many mining areas. This brought a maneuver by Lewis in the form of a telegram to the presidents of the various mine districts in which he expressed "gratification that production yesterday of re-examined and recertified mines and strip pits was substantial. I confirm policy of immediate resumption at each mine as fast as it is certified by federal mine inspectors as being in conformity with the safety mine code. Let us all hope that the belated efforts of the federal government to establish safety in the mines will not prove to be sporadic gesture and will pave the way for mandatory safety legislation by the federal Congress."

Mine operators considered this message as a "deceitful dodge" and charged that Lewis really was telling his miners not to return to work until an inadequate force of federal inspectors have had time to revisit all the mines and recertify them —a matter of weeks or months.

As the week wore on the back-to-work movement appeared to be gaining despite the Lewis message. Compilation of information of coal production, however, was hindered by the telephone strike.

The mine safety strike and the Centralia mine disaster which precipitated

it are expected to have important long-term repercussions.

One of these will take the form of deeper and more widespread opposition to the principle of government seizure and operation of private property. The Centralia accident demonstrated that the government cannot get into the field of private plant operation without incurring highly objectionable hazards.

The Krug-Lewis agreement of last May bound the government to full compliance with Federal Mine Safety Code. This would appear to place responsibility for the loss of life and property at Centralia on the government's failure to enforce and carry out the recommendations of the Bureau of Mines inspectors.

Another probable result of the disaster will be a bigger coal bill in the future. Coal mines cannot be made safe, and operated safely, without pushing up costs. There are such factors as changing from open to closed lights, using permissible explosives which are more expensive, providing new openings for ventilation or escape purposes, installing new and more powerful ventilating equipment, adoption of various techniques for operation of gassy mines and maintenance of additional workers to tend to safety chores.

Under preliminary discussion in Washington now is a government subsidy or price-support program for the coal industry to insure sufficient production under the probable higher costs.

Rolling Mills—Recently Installed or Scheduled for Early Completion

Company	Location	Type of Mill	Drive	Probable Completion Date (Estimates Only)
		Continuous Cold Reduction Strip Mills		
Acme Steel	Riverdale, Ill.	26″ 5-Stand Tandem	W	Late 1947
American Rolling Mill	Butler, Pa.	54″ 5-Stand Tandem	W	Middle 1947
Bethlehem Steel	Lackawanna, N. Y.	54″ 4-Stand Tandem	W	In operation early 1947
Bethlehem Steel	Sparrows Pt., Md.	56″ 4-Stand Tandem	W	In operation early 1947
Carnegie-Illinois	Gary, Ind.	42″ 5-Stand Tandem	W	2nd to 3rd quar. 1947
Carnegie-Illinois	Gary, Ind.	42″ 5-Stand Tandem	W	2nd to 3rd quar. 1947
Crucible Steel	Midland, Pa.	54″ 3-Stand Tandem	W	Early 1948
Great Lakes Steel	Detroit	54″ 3-Stand Tandem	W	2nd quarter 1947
Steel Co. of Canada	Hamilton, Ont.	54″ 5-Stand Tandem	W	Early 1948
Tennessee Coal, Iron	Fairfield, Ala.	54″ 4-Stand Tandem	W	2nd to 3rd quar. 1948
Weirton Steel	Weirton, W. Va.	42″ 5-Stand Tandem	W	2nd quarter 1947
Allegheny Ludlum	W. Leechburg, Pa.	28″ 4-Stand Tandem	GE	In operation late 1946
Carnegie-Illinois	Gary, Ind.	54″ 4-Stand Tandem	GE	2nd quarter 1948
Columbia Steel	Pittsburg, Calif.	56″ 5-Stand Tandem	GE	2nd to 3rd quar. 1947
Columbia Steel	Pittsburg, Calif.	1—800 hp Drive 3-St'd. Tandem	GE	
Great Lakes Steel	Detroit	93″ 3-Stand Tandem	GE	2nd quarter 1947
Inland Steel	Indiana Harbor, Ind.	42″ 5-Stand Tandem	GE	2nd quarter 1947
Jones & Laughlin	Aliquippa, Pa.	42″ 5-Stand Tandem	GE	2nd quarter 1947
Granite City	Granite City, Ill.	56″ 4-Stand Tandem	Allis	2nd quarter 1947
		Hot Strip Mills		
Bethlehem Steel	Sparrows Pt., Md.	68″ Cont. Hot Strip	Allis	Late 1947
Crucible Steel	Midland, Pa.	Rev. Hot Strip	GE	Early 1948
Geneva Steel	Geneva, Utah	2 Stand Addition	GE	Early 1948
Inland Steel	East Chicago, Ind.	76″ Hot Strip, 1 Drive	GE	Middle 1947
Republic Steel	Youngstown	48″ Hot Strip	GE	Middle 1947
Tennessee Coal, Iron	Fairfield, Ala.	2 Stand Addition	GE	In operation early 1947
		Skin or Temper Pass Mills		
Bethlehem Steel	Sparrows Pt., Md.	56″ Temper Mill (Coils)	W	In operation early 1947
Bethlehem Steel	Sparrows Pt., Md.	56″ Temper Mill (Sheets)	W	In operation early 1947
Bethlehem Steel	Sparrows Pt., Md.	2 Stand Temper Mill	GE	Early 1947
Bethlehem Steel	Sparrows Pt., Md.	32″ Temper Mill	Allis	Late 1947
Bethlehem Steel	Sparrows Pt., Md.	2 Stand Temper Mill	GE	Late 1947
Columbia Steel	Pittsburg, Calif.	42″ Temper Mill	Allis	Late 1947
Columbia Steel	Pittsburg, Calif.	60″ Temper Mill	Allis	Late 1947
Inland Steel	Indiana Harbor, Ind.	72″ Temper Mill	Allis	Late 1947
Inland Steel	Indiana Harbor, Ind.	54″ Temper Mill	Allis	Late 1947
Jones & Laughlin	Cleveland	54″ Temper Mill	W	In operation late 1946
Weirton Steel	Weirton, W. Va.	54″ Temper Mill	W	2nd quarter 1947
		Bar and Rod Mills (Continuous)		
Aceros Nacionales	Mexico	24″ Bar and Billet Mill	W	Middle 1947
Aceros Nacionales	Mexico	10″ Rod Mill	W	Middle 1947
Aceros Nacionales	Mexico	14″ Merchant Bar Mill	W	Middle 1947
Bethlehem Steel	Lackawanna, N. Y.	10″ Bar Mill	GE	2nd quarter 1947
Bethlehem Steel	Los Angeles	12″ Merchant Bar	Crocker Wheeler	Late 1947
Copperweld Steel	Warren, O.	9″ Bar Mill	W	Indefinite
Copperweld Steel	Warren, O.	12″ Bar Mill	W	Indefinite
Crucible Steel	Midland, Pa.	24″ 6 Stand Billet Mill	GE	Middle 1947
Crucible Steel	Midland, Pa.	Rod Mill	GE	Late 1947
Laclede Steel	Alton, Ill.	10″ Morgan Rod Mill	W	Middle 1947
La Consoladida S.A.	Mexico City, Mex.	Rod Mill	GE	Middle 1947
Latrobe Elec. Steel	Latrobe, Pa.	Bar Mill	W	2nd quarter 1947
National Tube	Lorain, O.	20″ Continuous Billet	Allis	Late 1948
National Tube	Lorain, O.	26″ Continuous Billet	Allis	Late 1948
Sheffield Steel	Kansas City, Mo.	Morgan Rod Mill	GE	Middle 1947
		Reversing Blooming, Bar and Billet Mills		
A. M. Byers	Economy, Pa.	26″ Blooming Mill	GE	Early 1947
Bethlehem Steel	Los Angeles	32″ Blooming Mill	Allis	Late 1947
National Tube	Lorain, O.	46″ Blooming Mill	W	2nd quarter 1948
National Tube	Lorain, O.	35″ Bar Mill	Allis	2nd quarter 1948
Wheeling Steel	Wheeling, W. Va.	36″ Blooming Mill	W	3rd quarter 1948

Fontana Freight Not Included in ICC Rate Study

Kaiser advises lower rates being negotiated with carriers and he will not enter formal protest on Fontana tariffs

GROUNDWORK was being laid last week by the Interstate Commerce Commission for investigation of rail freight rates from Geneva, Utah, to Pacific Coast points. Hearing dates have not been set.

The rates to be studied are those which went into effect Apr. 1 following several weeks' suspension pending disposal of protests by Henry Kaiser and various eastern steel producers. In ordering the rates into effect as of Apr. 1 the ICC said a thorough investigation of the rate structure would be made.

It was learned last week that freight rates from Kaiser's Fontana steelworks will not enter into the Geneva rate investigation at this time, as had been earlier thought. Thomas K. McCarthy, San Francisco attorney representing the Kaiser interests, in response to a letter from the ICC has advised that body that negotiations for lower freight rates from Fontana are proceeding with the railroads so that Kaiser will make no formal complaint about the Fontana rates to the commission at present.

Further Data from Kaiser Asked

Recently the ICC wrote Mr. McCarthy indicating it desired information on the Fontana rate situation more detailed than that offered at the recent hearing on Kaiser's protest against lower rates from Geneva. In objecting to the Geneva reduction on finished steel, Mr. McCarthy had contended Kaiser's plant would be adversely affected in two ways. First, the lower rates from Geneva to the Coast would force Kaiser to meet lower delivered prices which, in turn, would mean lower prices at the Fontana mill. Secondly, the freight rates paid by Kaiser on iron ore and coal shipments were unreasonably high when compared with the proposed finished steel rates from Geneva.

Writing to Mr. McCarthy, the commission recalled that he had alluded to the Fontana rates only "in very general terms." Chairman Clyde B. Aitchison, who has been assigned the Geneva case for personal supervision, asked Mr. McCarthy for more detailed information.

"Careful study," said Mr. Aitchison, "shows we do not have a statement of the commodities, their origins and destinations, the rates charged, and the carriers supposed to be violating the Interstate Commerce Act, sufficient to warrant institution of an investigation on our own motion.

"It appears in the course of your argument that the company you represent presented to certain railroads, as far back as last summer, requests for a certain basis of rates on raw materials and finished products, which in part the carriers declined to publish.

"We wish to proceed with the investigation of the steel rates from Geneva involved in this proceeding, as speedily as possible, and have notified the parties to be preparing their evidence.

"If it is desired to secure a determination as to the lawfulness of the rates to and from the Fontana plant and an order prescribing rates, in approximate synchronization with the investigation of the rates from Geneva, it will be necessary to bring the complaint before us with sufficient clarity and precision to advise the carriers and others as to the nature and substance of the complaint, and because of the time element this should not be delayed."

Chairman Aitchison has named J. P. McGrath as chief examiner in the Geneva rate case, but no date for the start of oral hearings will be set until the interested parties have signified that they are prepared to present their arguments and submit to questioning.

BIG DRUGSTORE: Aerial view of the World Headquarters Building of the Rexall Drug Co. in Los Angeles is shown above. The 2-story reinforced concrete building covers three acres of a six-acre site

West Coast Steel Product Shortages Force Some Area Fabricators To Limit Operations

THE STEEL famine plaguing the West Coast shows no signs of easing. In some products, the scarcity is worse.

These shortages, which are forcing curtailed operations on most steel fabricating companies in the West, are most severe in all sheet products. Scarcities also have been intensified on other items on which the West's chief source of supply is eastern or midwestern steel mills.

In addition to steel sheets, the greatest scarcities exist in the following products on the West Coast at present: Cold-finished bars, ½ inch and under; eastern-rolled structurals; wide flange and I-beams; and small sized bars.

The universality of these shortages is shown by a spot survey of a number of leading West Coast fabricators and steel dealers.

For example, a large western manufacturer of household equipment is able to obtain only about one-fourth of its sheet requirements.

A producer of air conditioning equip-

ment also is getting only about 25 per cent of its needs. This company reports that its inventory of sheet steel currently is only about 10 per cent of normal, and that it is subsisting almost entirely on hand-to-mouth shipments.

On the other hand, West Coast steel mills are increasingly optimistic concerning their steel scrap prospects. Although supplies of scrap still fall below demand, the material in recent weeks has been becoming more plentiful.

In the San Francisco area, for example, steel plants now have an average of about 30 days' supply on hand, and scrap is moving more freely into stockpiles.

A similar situation exists in southern California, according to reports from Los Angeles. A scrap dealer there now terms the situation less severe than in the East.

In the San Francisco area at present 14 of the district's 16 open-hearths are operating, the remaining two being shut down for repairs. Barring further maintenance shutdowns, it is expected the district's furnaces will be at capacity shortly.

Acquits 58 in Trust Action Against Plumbing Industry

Federal Judge Robert N. Wilkin, Cleveland, has ordered the acquittal of 58 individuals remaining in the government's seven-year-old case charging conspiracy to violate the Sherman antitrust law in the plumbing goods industry.

Condemning mass trials which are so large as to submerge the individuals in the group, Judge Wilkin ended the longest, most costly case in antitrust law prosecutions and one which involved the greatest number of defendants.

Judge Wilkin ruled the evidence presented by the government failed to support the charge that the defendants had entered into a nation-wide conspiracy to control the distribution of plumbing goods from manufacturers, to wholesalers, to master plumbers.

A federal grand jury on Mar. 29, 1940, returned an indictment against 102 manufacturers, jobbers, trade associations, master plumbers' groups, plumbers' unions and individuals. It charged a conspiracy to violate section I of the Sherman Act.

When the case was ready for trial, the country was involved in war. Defendant manufacturers had converted their plants to war production, and the War Department asked for a continuance until after termination of hostilities.

Peace restored, the trial was set for the autumn of 1946. In the interim nine defendants had died, 16 had entered pleas of nolo contendere and had paid fines, and separation and continuance was granted to one. The trial began last Nov. 18. On Feb. 28 the government rested and defense counsel filed motions for dismissal of the charges.

Charges dismissed were against Detroit Association of Master Plumbers, Greensboro Plumbing & Heating Contractors, Canton, O., Local No. 94 of United Association of Journeymen Plumbers & Steam Fitters of the United States and Canada, Manufacturers' Clearing House of Illinois, Kohler Co., Sloan Valve Co., National Association of Master Plumbers of the United States, United Association of Journeymen Plumbers & Steam Fitters of the United States and Canada and the ten individuals who were charged with what they had allegedly done as officers of such companies and associations.

There remained the 58 who were acquitted and who for the most part were various plumbing union locals and their officers or business agents. Total cost of the case to prosecution and defense was estimated at $3 million.

Permanente Metals Corp. Opens New Soda Ash Plant

Completion of a soda ash plant with daily capacity of 100 tons at Owens Lake, Calif., has been announced by Permanente Metals Corp., Oakland, Calif. The new plant, which was built to relieve the shortage of soda ash used in conversion of bauxite ore to alumina powder, will partially supply Permanente's Baton Rouge, La., works.

Operation of the new Kaiser-directed plant is a further step toward Permanente's plans for complete integration of an aluminum industry, complete from bauxite ore mines in South America to finished rolling operations at its mill in Spokane.

Dredge Pump Casing Built By Steel Plate Fabrication

Fabrication from steel plate of one of the largest dredge pump casings ever built in this manner was recently completed at Bethlehem Steel Co.'s San Francisco Yard for installation in the suction dredge *Papoose*, owned by Hydraulic Dredging Co. Ltd., Oakland, Calif. The new pump, which weighs 42,000 lb, was designed by the dredging company and is part of a modification program converting the *Papoose* from a 20 in. to a 30 in. dredge.

The fabricated casing, which is lighter than a conventional heavy cast steel pump casing, is of the overshot type and is laid out as a modified spiral with a maximum inside diameter, excluding liners, of almost 9 ft.

Substantial Rise In New Firms Noted in Texas

Net increase of 14,000 businesses paying social security taxes recorded in Dallas district

DALLAS, TEX.

INDUSTRIAL growth of Texas during the past three years is indicated by the report of the collector of internal revenue, Dallas district, which shows a net increase of 14,000 in the number of businesses that have filed federal security taxes.

In the district, which extends from Texarkana, on the Texas-Arkansas line, to San Angelo in Central West Texas, 21,633 new social security accounts were opened in 1946. Change of business status, however, reduced the net increase to the 14,000 figure, it is pointed out.

In Dallas alone 1679 new business firms were started during 1946, and 164 additional businesses have begun operations since last December, officials of the Dallas Chamber of Commerce report. Of this total 104 of the new concerns were industrial.

Boom in Construction Continues

Throughout Texas a marked decrease in industrial and business construction contract awards is noted in the past week or ten days, though the total of building awards of all types continued at record-breaking peacetime peaks. A flurry of spring homebuilding contracts keeps the boom figures a full $40 million ahead of the same date last year. Contract awards are pushing close to the $150 million mark for 1947. Home construction is now leading the pace by a wide margin, despite high costs and a continued shortage of labor and materials.

Industrial construction totals were dealt a severe blow by announcement of Dow Chemical Co. that it is sharply curtailing its $1 million plant expansion program at Freeport. Dr. A. P. Beutel, head of Dow's Texas interests, says at least one-third of its program has either been postponed or canceled because of high costs and materials shortages. The slowdown was ordered, he says, because of uncertain business conditions and to avoid waste in rushing the work through at high cost.

The state needs 20,166 additional skilled construction workers, regional officials of the U. S. Department of Labor declare.

Surplus Machine Tool Sales Are At Slower Pace

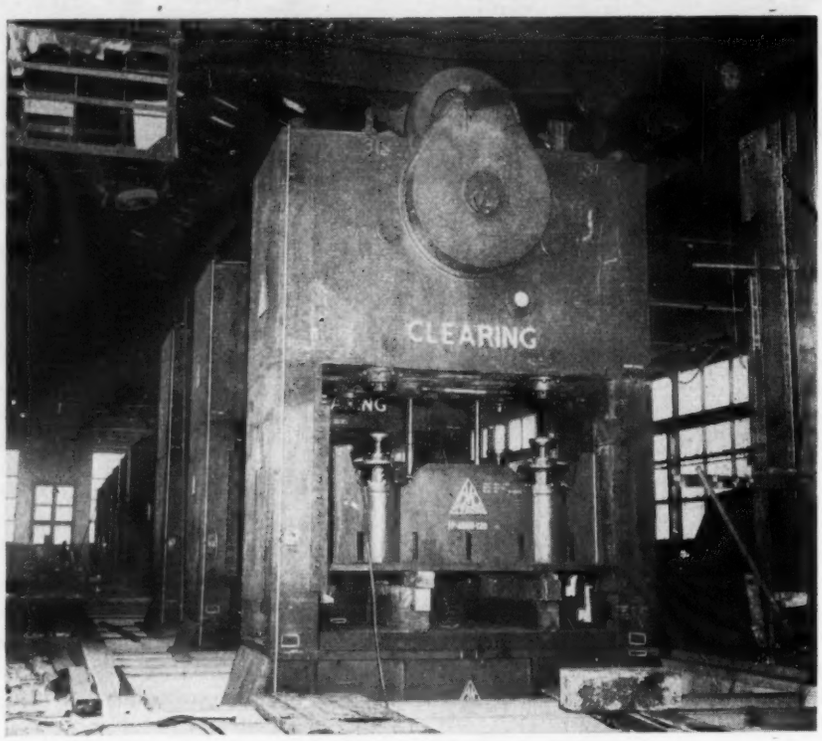
Inventory turnover in Cleveland region occurs only every 13 months as against 5 months formerly, administrator says

SALES of surplus machine tools and other surplus materials in the Cleveland region have slowed to the point where inventory turnover occurs only every 13 months, compared to a previous turnover of every five months, Brig. Gen. Isaac Spalding, War Assets administrator for the third zone, said at a press conference last week.

General Spalding, who is visiting WAA regional offices in his zone in an attempt to speed disposals, admitted that machine tools are moving slowly to private industry, but he hastened to add that in disposing of tools consideration must be given to private tool builders and the agency should avoid dumping and flooding the market with the surpluses.

Cost of selling surplus goods has mounted, the general stated, citing February sales costs in the Cleveland region of 40 cents for every dollar received from sales by WAA, against January costs of 37 cents. Reduction of costs is of importance to the agency, he continued, and faster movement of surpluses must be accomplished to lower warehousing and handling charges.

Because costs are so important, no plans are being made to develop sales outlets of the type which have been tried in St. Louis, Chicago and New Orleans, where sales of consumer goods to veterans were made in special WAA-operated stores. However, the general told STEEL's reporter, over-the-counter sales of merchandise of interest to veterans will continue to be made. One such sale—that of 411 carpenter tool kits—was made at the Cleveland office recently with almost 3000 ex-service men (and women) stampeding the office in an attempt to get the hand tools.



STAMPING SHOP: This view of the new $5 million stamping shop at Willys-Overland Motors Inc. plant at Toledo shows nine of the 350-ton capacity presses of a total of 53 which the company will use to form bodies for new truck and passenger car models. Under construction since last July, the shop will begin production in 30 days

National Tool Co. Reports Higher Net Income in 1946

National Tool Co., Cleveland, announced recently that its net income for 1946 was $75,785, compared with a profit of $58,420 in 1945. Net sales in 1946 were $2,056,875 as against $2,167,282 in 1945.

The company experienced a sharp increase in the rate of shipments during the last half of the year, Harry W. Barkley, president, reported and added that the trend has continued through the first quarter of 1947. The company's present order backlog is more than double the backlog at the start of 1946, he stated.

Although inability to obtain skilled help is a limiting factor on production, Mr. Barkley said, the company is now employing 525 persons, which is an increase of 44 per cent over the 365 employed a year ago.

Inquiry Held on Cancelled Surplus Machine Tool Sale

Cancellation of an advertised sale of 2700 surplus machine tools at the Lockland, O., plant of Wright Aeronautical Corp. is the subject of a special inquiry being held by a Senate Surplus Property subcommittee in Washington.

Testimony concerning the sale, which was called off shortly after it began with the completed sales voided, was given by Harold R. Wright and George F. Hughes of H. R. Wright Co., Detroit, who said they had waited in line since early evening of the day preceding the sale in order to get the best tools.

The sale which opened at 9:30 was called off at 10:30, Mr. Wright said, on orders from Washington. He added he had planned to buy $250,000 worth of machinery and had the money in hand.

A. A. Throckmorton, deputy director of sales for War Assets Administration, confirmed that the sale had been cancelled on Washington orders but was unable to give the committee detailed answers as to the reasons for these orders. He stated, however, that the tools had been earmarked on V-J Day as "stand-by" equipment by the Army Air Forces and had remained thus tagged for 18 months until this arrangement became "obsolete." The tools had then been offered for sale.

Giddings & Lewis Machine Tool Co.'s 1946 Profit Up

Net earnings in 1946 of $546,525 were announced recently by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. This compares with a profit of $511,733 in 1945.

Sales were $6,529,373 during the year, the company revealed and added that unfilled orders at the end of the year were only slightly less than at the end of 1945.

In 1947, the company said, it expects to announce several additions to its line of horizontal boring, milling and drilling machines and will produce a line of plastic molding machinery.

Proposal To Raise Freight Rates On Lcl Steel Shipments Opposed

Storm of protests from producers of bolts and nuts, wire, chain, nails and other products follows railroads' application for relief. Hearing set for Apr. 15 at Buffalo, but it may be deferred until early May

PROPOSAL of the railroads to establish fourth class freight rates as a minimum basis on less carload shipments of finished steel to, from and within "official territory" has stirred up a storm of protests from producers of bolts and nuts, wire, chain, nails and other items.

Carriers claim they are losing money on less carload shipments, making it necessary for the carload rates to carry more than their share of transportation costs. This is particularly true, it is said, in those instances where door-to-door delivery is involved.

Discussion of the proposal to raise rates has been set for Apr. 15 at Buffalo. However, this meeting might be postponed until early May to give shippers more time to prepare formal arguments against the proposed rate increase.

The proposed and present freight rates from Pittsburgh to a few southern destinations are in the following table.

FREIGHT RATES

(Per 100 pounds)

Destination	Present	Proposed
Birmingham	$1.08	$1.48
New Orleans	1.34	1.84
Memphis	.98	1.35
Atlanta	1.13	1.54
Fort Worth	1.86	2.05
Dallas	1.86	2.05
Houston	1.97	2.17

The freight rate advance on less carload steel shipments contemplates increasing rates within "official territory" from class 40 to class 50, equivalent of 25 per cent. From "official territory" to western trunk line southwestern territory the present class 50 rate would become class 55, an average increase of 10 per cent; into the southern territory the present class 40 rating would become 55, an average increase of 37.5 per cent.

Shippers here state flagrant discrimination against "official territory" shipments would result under this proposal in shipping to the South and West in favor of producers located and shipping within those latter territories whose rates are not proposed to be increased.

It is pointed out "official territory" shippers under Ex Parte 162 case already have suffered a greater increase in freight rates than applied in other territories and if the Interstate Commerce Commission's decision in docket 28300 is upheld, "official territory" traffic would be subjected to an additional 10 per cent increase.

Regional Metals Conference To Be in Boston May 23-24

A conference on the technology of metals will be held in Boston, May 23 and 24, by the Boston chapter of the Institute of Metals Division, American Institute of Mining & Metallurgical Engineers. With headquarters at Hotel Sheraton, the conference will feature a technical session with a discussion of new developments in nonferrous metallurgy and a physical metallurgy seminar on "Flow and Fracture of Metals" with Dr. Morris Cohen, Massachusetts Institute of Technology, as chairman.

American Welding Develops Torsion Spring for Railroads

An eastern railroad will give a tryout this year to a new type of torsion spring for railroad car trucks developed by American Welding & Mfg. Co., Warren, O. The company claims this new development will eliminate side-sway in freight trains, enabling railroads to speed up their schedules with less damage to shipments and less wear to cars, locomotives and rails.

Calendar of Meetings . . .

Apr. 14-17, Second Southern Machinery and Metals Exposition: Atlanta Municipal Auditorium, Atlanta, Ga. Managing director is Michael F. Wiedl, Box 4687, Atlanta 2.

Apr. 16-18, Society of Automotive Engineers: Transportation meeting, Hotel Stevens, Chicago.

Apr. 21-23, National Open Hearth Steel Committee of AIME: Thirtieth annual conference, Netherland Plaza Hotel, Cincinnati. Committee headquarters are at 29 W. 39th St., New York.

Apr. 24, American Society for Metals: Ninth annual meeting of Cincinnati, Columbus and Dayton, O., chapters, Fort Hayes Hotel, Columbus. Reservation chairman is R. E. Christin, Columbus Bolt Works Co., Columbus.

Apr. 24-25, American Management Association: National conference on production methods and management, Hotel New Yorker, New York. Association president is Alvin E. Dodd, 330 W. 42nd St., New York.

Apr. 28-29, American Zinc Institute: 29th annual meeting, Hotel Statler, St. Louis. Headquarters are at 60 E. 42nd St., New York 17.

Apr. 28-30, Santa Monica Chamber of Commerce: First Annual Industrial show, Santa Monica Technical School, Santa Monica, Calif.

Apr. 28-May 1, American Foundrymen's Association: Annual convention, Book-Cadillac and Statler hotels, Detroit. Association headquarters are at 222 W. Adams St., Chicago.

Apr. 29-30, May 1, Industrial Packaging Engineers Association: Second annual exposition, Hotel Sherman, Chicago. Managing director is C. J. Carney Jr., 20 W. Jackson Blvd., Chicago.

May 1-2, Society of Automotive Engineers: Personal aircraft meeting, Hotel Lassen, Wichita, Kans.

May 5-6, National Welding Supply Association: Annual convention, Philadelphia.

May 5-9, American Gas Association: Industrial Gas School, Seneca Hotel, Columbus, O. Chairman is Karl Emmerling, 420 Lexington Ave., New York.

May 5-11, Society of the Plastics Industry: Second National Plastics Exposition, Coliseum, Chicago. Society's headquarters are at 295 Madison Ave., New York.

May 8-9, Magnaflux Weld Inspection Conference: Congress Hotel, Chicago. Sponsored by Magnaflux Corp., Chicago.

May 11-14, American Supply & Machinery Manufacturers' Association Inc.: 1947 Convention, Hotel Traymore, Atlantic City, N. J. R. Kennedy Hanson, 1108 Clark Bldg., Pittsburgh, general manager.

May 12-15, American Steel Warehouse Association: 38th annual meeting, Biltmore Hotel, Los Angeles. Association president is Walter S. Doxsey, 442 Terminal Tower, Cleveland.

May 12-15, American Mining Congress: 1947 annual coal convention and exposition in Cleveland. Association secretary is Julian D. Conover, 309 Munsey Bldg., Washington.

May 15-17, Society for Experimental Stress Analysis: Annual meeting, Stevens Hotel, Chicago. Society's address is P.O. Box 168, Cambridge 39, Mass.

May 18-24, World Trade Week: Sponsored nationally by the Chamber of Commerce.

May 21-22, American Iron & Steel Institute: 55th general meeting, Hotel Pierre and the Waldorf-Astoria, New York. Institute headquarters are at 350 Fifth Ave., New York 1.

May 21-24, American Society of Mechanical Engineers: 19th national conference on oil and gas power, Cleveland.

May 22-24, Automotive Engine Rebuilders Association: Silver anniversary convention at Hotel Statler, Detroit. R. G. Patterson, 415 N. Capitol Ave., Indianapolis, is association executive vice president.

May 22-31, Mid-America Exposition: Cleveland Public Auditorium; show of goods made and used in area bounded by Detroit and Buffalo, Cincinnati and Pittsburgh.

May 23-24, Institute of Metals Division, AIME: Boston regional conference, Hotel Sheraton, Boston. Conference chairman is H. I. Dixon, Sterling Alloys Inc., Boston.

May 26-27, Association of Iron & Steel Engineers: Annual Spring Conference, Benjamin Franklin Hotel, Philadelphia.

May 26-29, American Society of Mechanical Engineers: Aviation meeting, Los Angeles.

May 27, Metal Powder Association: Third annual spring meeting at Waldorf-Astoria Hotel, New York. Association headquarters are at 420 Lexington Ave.

June 1-6, Society of Automotive Engineers: Summer meeting, French Lick Springs Hotel, French Lick, Ind.

June 2-4, American Gear Manufacturers Association: 31st annual meeting, The Homestead, Hot Springs, Va. Association executive secretary is Newbold C. Goin, Empire Bldg., Pittsburgh.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

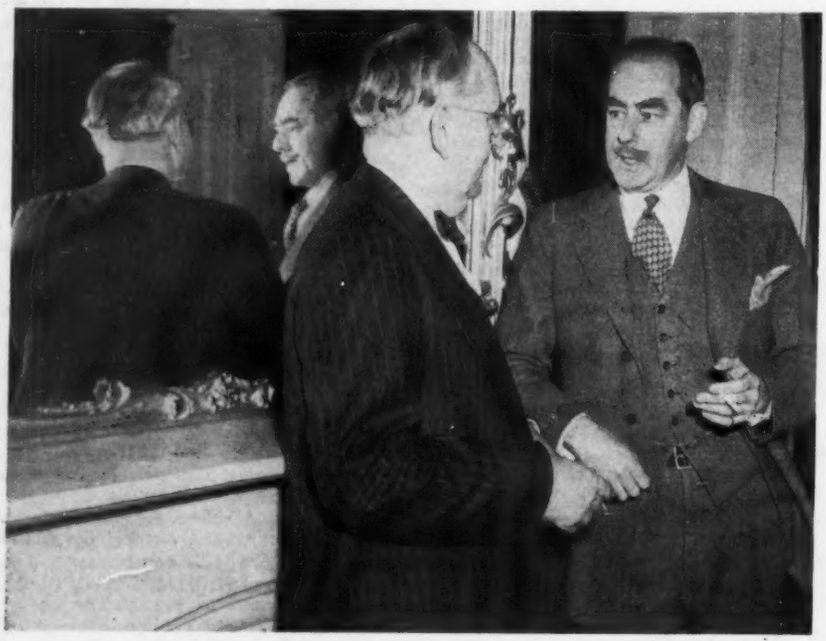
Reciprocal trade agreements program not entirely in the clear. Views of western senators that Tariff Commission should be the agency for adjusting tariff rates reported winning increasing support

RECENT congressional interest in tariff rates opens the possibility that the Reciprocal Trade Agreements program may not be, as recently was indicated by statements by Senate Republican leaders, in the clear. Sen. George W. Malone (Rep., Nev.) has won some support for his view that the Tariff Commission should be, as intended originally by Congress, the agency for adjusting tariff rates. "The State Department," said Senator Malone, "has little acquaintance with specific situations in the domestic economy and might subscribe to agreements which could wipe out the livelihood of entire communities in the United States."

Specifically, Senator Malone and some other western senators think rate adjustments would be handled more intelligently if carried out by the Tariff Commission under the "flexible tariff provision" in section 336 of the Tariff Act of 1930. When manufacturers and businessmen ask for tariff relief, the Tariff Commission, under this provision, must conduct an adequate investigation to determine production costs of the particular commodity in the United States and in the foreign countries selling that commodity here. Under section 336 the President, upon receiving a recommendation from the Tariff Commission, may revise tariff rates up or down to the extent of 50 per cent.

Although the Tariff Act of 1930, with this flexible provision, is still on the books, STEEL learns that United States businessmen are not making use of it. Not a single application for relief under section 336 now is before the Tariff Commission. A commission spokesman told STEEL that to a considerable extent this situation results from war conditions and from the continued shortage of many commodities since the end of the war; in other words, there is an absence of the keenly competitive world situation which in normal times causes domestic manufacturers to seek maximum protection.

As pointed out by Senator Malone, the possibilities of getting additional protection under section 336 continue undiminished. When a businessman seeks an increase in a tariff rate under this section, the only bar to favorable action, if the Tariff Commission decides relief is needed to protect the domestic economy, is prior action under the Reciprocal Trade Agreements Act of 1934 as amended. In other words, a change up to 50 per cent under section 336 of the Act of 1930 cannot be in addition to a change negotiated by the State Department under the Reciprocal Trade Agreements Act.



FAVOR GRECO-TURKISH AID: Acting Secretary of State Dean Acheson, right, and Sen. Arthur Vandenberg (Rep., Mich), chairman of the Senate Foreign Relations Committee, talk over the program to supply aid to Greece and Turkey as a means of combating communism. NEA photo

Economic Studies Pushed

The important Joint Committee on the Economic Report has engaged two economists who are expected to find the causes of the great economic depressions that in times past always have followed closely after major wars. The hope is that these men will help Congress to devise a plan which will prevent a disastrous depression to follow World War II. They are to work closely with the President's Council of Economic Advisers headed by Dr. E. G. Nourse.

The economists are Charles O. Hardy and Fred E. Berquist. Mr. Hardy for two decades served as an economist with the Brookings Institution, then was vice president of the Federal Reserve Bank at Kansas City and recently has been connected with the Association of Commerce in Chicago. Mr. Berquist served as an economist in the Department of Justice for many years and on several occasions was loaned to committees of Congress. He steered the oil industry investigation conducted by the old Temporary National Economic Committee. He also wrote the able postwar planning report submitted to the 79th Congress by Senator George's Committee on Postwar Economic Policy & Planning.

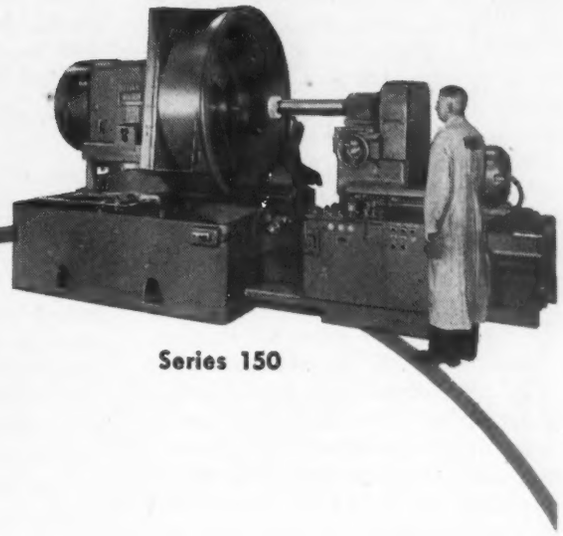
Puzzle for State Department

State Department officials are scratching their heads in puzzlement as to what can be done to fill the gap created by the decision of the International Training Administration Inc. to go out of business. Directors of this private non-profit corporation have decided to suspend operations and dispose of commitments and staff as a move in the direction of liquidation. The reason: The service fees charged by this company have proved inadequate to support its operations, and the company has no source of working capital.

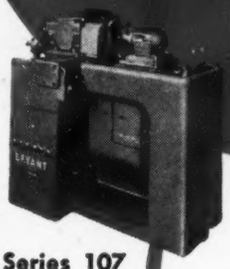
The International Training Administration was incorporated in 1944 to take

A fine line

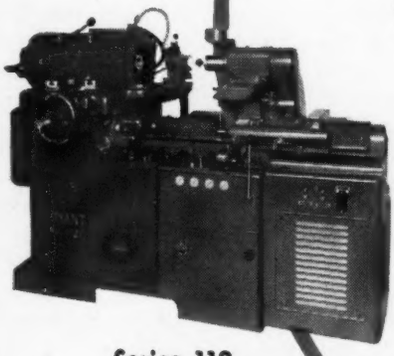
of Internal Grinders for every tool room and production requirement



Series 150



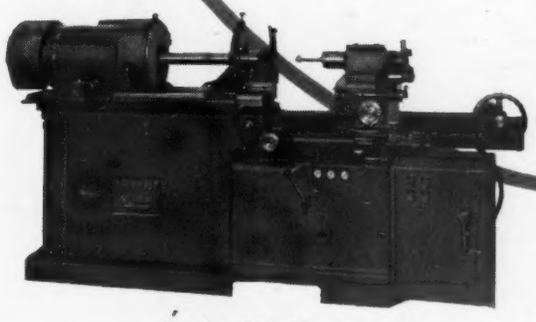
Series 107



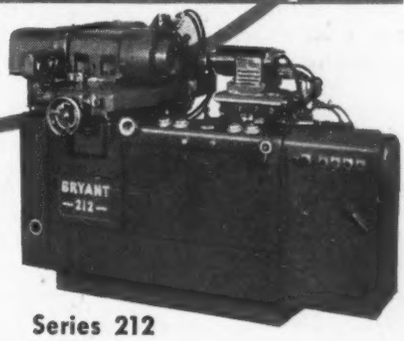
Series 112

BRYANT has designed and built precision internal grinders for 38 years. Today, their completely modern line covers the grinding of holes from .040" to 50" in diameter. Standard and special machines will grind straight, tapered, curved and irregular holes, or any of these in combination. Face and hole grinding can be combined to assure squareness. Cams and irregular holes can be ground by using the cam attachment. The Series 150 has a face plate 60" in diameter and will swing work up to 50". A special machine will take 100" swing. The Series 107 is equipped with Bryant High Frequency wheelheads giving speeds up to 100,000 R.P.M. for extremely small bores. Maximum swing of the 107 is 9". Series 112 machines are for general purpose tool room work. They incorporate many quick-changeover features and will swing 16". The 112-M machines are similar to the 112, but have provision for grinding long bores such as machine tool spindles. Series 212 grinders are completely automatic and will grind bores from 5/16" to 6" in diameter. The High Frequency head is used on the 212 for maximum efficiency on small bores. All these machines incorporate the exclusive Bryant feature of hardened and ground cylindrical slide construction and three-point bearing. Complete specifications are available on all Bryant precision internal grinders — write today.

BRYANT Postwar Development



Series 112 M



Series 212

Send for the Man from

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

BRYANT

over one of the activities inaugurated early in the war by the Co-ordinator of Inter-American Affairs. This consisted of making all arrangements incidental to handling of young men from foreign countries brought here to be made familiar with American "know-how." Under the program some 2500 young people have received training in the United States and, on returning to their native countries, have taken with them an appreciation and understanding of American products. Altogether nationals of 24 countries were involved—the 20 Latin American republics, and China, Turkey, Egypt and Spain.

More than 700 United States industrial corporations have participated in the program. They have been glad to furnish training and pay the expenses of the young foreigners during the training period as an investment in good will. In many cases the companies participating have received substantial export orders initiated by the former trainees. Companies in many industries co-operated—in steel, machine tools, electrical equipment, chemical industries, the railroads, automobiles, and many other industries. In addition, government departments co-operated by training foreigners in road building, port development, health and sanitation and other fields.

One reason why the State Department would like to see this work continued is the sudden expansion in interest from abroad.

Labor Bills Still Stewing

The two labor committees continued last week to be chary about divulging information about the labor bills they are getting ready to report. Last week there continued to be important differences in views on those three difficult phases—the future status of the closed shop, the future of bargaining on an industry-wide basis, and the future use of injunctions in cases of labor disputes. The House committee is expected to report a bill about Apr. 15 and the Senate committee shortly thereafter.

Auto Export Listing Changed

The Office of International Trade has removed passenger cars from the Positive List of Commodities and has placed them under general license for exportation to Group K countries. However, validated licenses are still required for exportation of passenger cars to Group E countries. Holders of valid limited production licenses for the exportation of passenger cars to Group E countries may continue to export against such licenses until the full amount licensed for export to these countries has been shipped or until the validity period of the license has expired, whichever is sooner. Exporters desiring to ship additional passenger cars to Group E countries should submit applications for individual licenses.

The procedure for licensing coal and coke for export has been changed in these two ways: 1—Licenses for exporting these fuels to all countries will allocate tonnages for each port in accordance with the loading capacity of that port, and 2—export licenses will be issued for a future validity period. Exceptions provide that specific Pacific ports will not be designated on licenses to export coal and coke to far eastern destinations, and that licenses to export coke to western hemisphere destinations will not carry port designations.

The following have been deleted from the Positive List of Commodities requiring a validated license for export; and have been placed on general license for exportation to all destinations in Group K: Terne plate clippings and scrap; iron bars, 1-inch and under; fabricated steel buildings, knockdown included; portable knockdown houses; structural shapes fabricated beyond mill forms; tin cans, finished or unfinished; sinks and other plumbing fixtures excepting lavatories and wall lavatories; cooking and heating stoves except electric; central heating equipment; other domestic cooking or heating equipment including janitrols, space heaters, thermostatic elements, unit heaters and parts, warm-air registers and grills, heating system controls; barrel bolts, hasps, hinge parts and other building hardware; aluminum sheets, plates and strips; brass and bronze hinges and butts; fuse plugs under 2800 volts; water heaters and parts, domestic; all nonfluorescent lighting fixtures and parts; wall plates; temperature controllers and parts; concrete block machines, multiple-mold 2 and 3-block capacity; new and used passenger cars and station wagons and chassis; house trailers; toluol.

Foreign Students Numerous

The United States has become the world's leader in educational activities, with 17,000 foreign students now studying a wide variety of subjects in our colleges and universities.

One-fifth of the total number, or 3133, are studying engineering in more than 300 institutions in every state of the union and the District of Columbia. They are taking courses in mechanical, civil, chemical, mining, metallurgical and electrical engineering. In making this tabulation, the State Department was especially impressed with the fact that of the 3133 engineering students 937 come from countries in the Far and Near East which have substantial industrialization plans. Included are 29 from Greece, 178 from Turkey, 287 from India, 47 from Egypt, 37 from Iran, 18 from Iraq, 300 from China, 38 from the Philippines and 3 from Afghanistan.

The roster was compiled at the request of the Engineers Joint Council of New York, which plans to conduct the foreign engineering students on tours of United States engineering projects. These will be handled through the 260 local chapters of the American Society of Civil Engineers, the American Institute of Mining & Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Institute of Chemical Engineers.

Mines Bureau Studies Offered

Copies of the following publications may be had free by writing the Bureau of Mines, Washington 25, D. C.: Report of Investigations 4007 (Contains results of tests on lead-zinc deposits in Graham County, Ariz.); Report of Investigations 4027 (Contains results of explorations of lead-zinc deposits in Grant County, Wis.); Report of Investigations 4021 (Contains analyses of manganese deposits in Dona Ana County, New Mex. It was found that the presence of barium in this ore prevents recovery of a high-grade, salable manganese); Report of Investgiations 4005 (Contains analysis of samples of iron ore from Eureka County, Nev.); Report of Investigations 4010 (Contains analyses of samples of iron ore from Socorro County, New Mex.); Report of Investigations 4000 (Contains details of exploratory results on Phelps Stokes iron deposit in Nye County, Nev., where the existence of good-grade magnetite ore was disclosed); Report of Investigations 4011 (Contains analyses of samples of black magnetite sands in Clatsop County, Ore., and Pacific County, Wash.); Report of Investigations 4012 (Describes exploratory results at Blackbird cobalt deposits, Lemhi County, Idaho); Report of Investigations 4001 (Contains results of investigation of chromite-bearing sand deposit in Coos County, Ore.).

New Standard Promulgated

A Recommended Commercial Standard for formed metal porcelain enameled plumbing fixtures has been promulgated and accepted by manufacturers in this industry, following revisions to accord with the representative distributors, testing laboratories, government agencies and consumer organizations.

Belgium To Ship Steel to Britain; Germany Exports Industrial Products

British government plan to buy controlling interest in iron and steel companies to come before Cabinet soon. State Planning Committee of Russia projects huge increase in output of metallics, machinery, rolling stock

BRUSSELS

NEGOTIATIONS between the Belgian government and the British Iron & Steel Federation have resulted in an undertaking on the part of the Belgians to supply 92,000 tons of steel to Great Britain over the next 12 months.

Returns from Luxemburg show that in 1946 the output of steel ingots and castings was 1,294,000 metric tons, compared with 259,000 tons in 1945 and 1.437,000 tons in 1938. The output of pig iron was 1,365,000 tons in 1946, compared with 318,000 tons in 1945 and 1,551,000 tons in 1938.

Belgium has a coal problem similar to that which is worrying Great Britain; production is no more than stationary owing to shortage of manpower, and, so far, incentives have proved ineffective to induce young people to work in the mines. The position is expected to worsen when the German prisoners of war return to Germany in May. To allow stocks of power houses, gas works and domestic users to be maintained at the required level, deliveries to various industries, including iron and steel, were suspended during the first ten days of March. The outlook for increased iron and steel production is therefore not promising.

The Usines a Tubes de la Meuse have announced their intention to increase the capital from 50 million francs ($1,136,300) to 200 million francs ($4,545,500) by a revaluation of their assets, and without issuing new shares for cash.

Germany

Preparations are under way to export industrial products from the Anglo-American zone of occupation. These exports will include mainly chemicals, scientific instruments, diesel engines and other industrial products. It is reported that contacts have already been made with the Belgo-Luxemburg economic union.

Output of steel in the British zone showed a decline in January owing to shorter coke supplies; the figures were 149,125 tons, as against 206,000 tons in November, 1946.

Great Britain

The first draft of a plan for the government to buy up a controlling interest in a number of iron and steel concerns is to come before the Cabinet soon. If this plan is accepted and goes through Parliament it will mean that the industry will be more than ever under the guidance of a national board, which would decide upon such matters as the level of imports and exports, which firms should produce certain types of steel, where and how industry should be expanded, etc. The difficulty will be with the smaller firms as this would necessitate the appointment of a large number of government directors. Such a step as that which is contemplated is not nationalization, but indicates that the specter still hovers over the industry.

A statement has been issued by the Iron & Steel Trades Employers Association and the Iron & Steel Trade Confederation announcing that an agreement which came into operation on Apr. 6 had been reached under which melting furnaces in the heavy steel trade will operate continuously throughout the week-end on the basis of a 48-hour week. Provision had also been made for those plants where furnaces are not yet able to operate fully throughout the week to work extra weekend shifts. It is estimated that the effect of the new agreement on output will be that an additional three-quarter million tons will be produced per year from the existing furnaces, and when all plants are able to complete arrangements to operate fully under the new scheme the additional output of steel ingots should be in excess of one million tons per year.

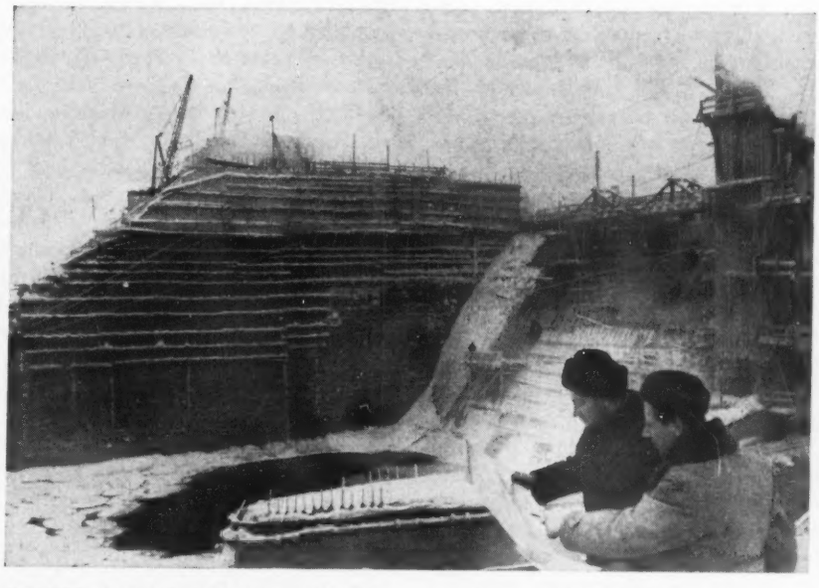
The allocation of steel to the cycle industry has been reduced by 50 per cent for a period of four months.

Stewart & Lloyds have announced plans to exceed by more than twice their steel capacity of before the war, and to double their tubemaking capacity.

John Summers & Son Ltd. propose to increase their capital by £1,680,000 ($6,720,000) to add new steel plant to their existing capacity, and obtain an extra 3000 tons of ingots per week. The capacity of their present hot and cold mills surpasses their present steel output.

Russia

For 1947 the State Planning Committee is reported to have provided for output of pig iron amounting to 121 per cent of the output of 1946; for steel the ratio is 119 per cent; for rolled products, 121 per cent; for power output, 116 per cent; for railroad freight cars, 208; for locomotives, 280; and for automobiles, 157. For iron and steel plant and equipment the output would be 166 per cent of the 1946 output; for agricultural machinery, 278 per cent; for tractors, 287, and for harvester combines, 520 per cent. It is also reported that 38 blast furnaces will be built in 1947, 100 open



SOVIET HYDROPOWER STATION: Dam for a hydroelectric power station being built in the forests of the River Kosva in the Urals is nearing completion. First turbine for the station is being assembled, the Russians say, and the power transmission lines are being constructed. Sovfoto

heath furnaces, and 54 batteries of coke ovens.

France

Coal deliveries during the first quarter were estimated to be sufficient to maintain steel production at its current level. Exports of iron and steel products from France in 1946 were only 142,000 metric tons, compared with 8000 tons in 1945 and 1,542,000 tons in 1938. Imports were 509,000 tons in 1946, 616,000 tons in 1945 and 71,000 tons in 1938.

Output of finished steel in January was 363,000 metric tons, slightly above the monthly average for 1938. Despite this higher production, little if anything is available for export as all the output is required for home consumption. Despite a marked increase in the production of plates and sheets, deliveries to the home market are being extended; 6 months is required for plates and up to 20 months for light gage sheets; the demand outstrips production.

Although the present output of coal in France is up to prewar level, the quality of the fuel is not good; the industry is suffering from lack of skilled labor. As a result, more scrap is being used in blast furnaces and the scrap position is becoming tight, while there is an abundance of iron ore.

Exports of motor vehicles are increasing. In December 1946, 4500 vehicles were sold abroad, representing 50 per cent of the output.

Holland

Dutch iron and steel imports in 1946 were 639,000 tons, only about half the 1939 tonnage. These imports consisted mainly of plates, merchant bars and structural steel. Imports from the United States included 48,000 tons of plates, 27,000 tons of concrete bars, 10,000 tons of structural steel, and smaller tonnages of merchant bars, and sheets. The main suppliers of rolled products were Belgium and Luxemburg; Great Britain supplied most of rails, cast iron pipe and steel tubes. Some tubes came from Czechoslovakia, and Germany supplied 1513 tons of heavy rails.

British Industries Fair To Show Remote Control Items

Remote control and materials handling equipment will be featured at the British Industries Fair in London and Birmingham from May 5 to 16 this year. Resumed after a lapse of eight years, the fair will also have on display sea and air navigation equipment, a gas injector designed to improve the performance of aerated burners and many other items developed during a period which included six years of war.

India Contemplates Steel Expansion To Raise Capacity to 3 Million Tons

Current steel production estimated at 1,200,000 tons annually. Country's industrialization and construction programs increase requirements. Special panel recommends immediate start of new facilities, with program to be completed in seven years

A 7-YEAR steel expansion program to increase India's steelmaking capacity to 3 million tons annually has been recommended to the government by the Iron & Steel Panel.

Present production of steel of all classes, including that made in ordnance factories, is estimated at 1,200,000 tons annually.

The panel believes the expansion will be required by India's rapid industrialization. India has a large roadbuilding and construction program. The government has decided to set up an aircraft factory. These and other projects are expected to consume an increasing quantity of steel.

Erection of a complete new plant is expected to require five years, and two more years probably will elapse before it attains rated capacity. Panel recommends that a new plant with initial capacity of 500,000 tons and ultimate capacity of 1,000,000 tons should be started immediately in either Bihar or in western Bengal. Private capital is said to be available.

Rerolling Industry To Reorganize

Special emphasis is placed on reorganization of the rerolling industry. These mills, the panel recommends, should roll special products which are required in relatively small quantities for special purposes and which cannot be more economically produced by the bulk production units. Some rerolling mills should be eliminated and those which are retained should be properly equipped, adequately financed and efficiently managed.

As a safeguard against uneconomic over-production, or the development of the industry on wrong lines, the construction of the units of production should be permitted only under license.

Notwithstanding the fact that wartime controls have been practically eliminated, black markets flourish in the Indian iron and steel trade. The panel has made detailed recommendations for continued controls, especially on prices. These should be unrelated to foreign prices and should be based on domestic costs figured for the industry as a whole.

To prevent the domestic price structure from being disturbed by foreign prices, the panel recommends that iron and steel imports be prohibited, except under license for specific purposes. To prevent an artificial shortage, the panel suggests that exports also should be forbidden, except under license.

While Indian iron and steel production costs have been low, the industry is disturbed over the rise in freight rates, prices of metallurgical coal and wages.

If private capital is to be attracted to finance the contemplated new facilities, government protection of assistance along the following lines will be necessary:

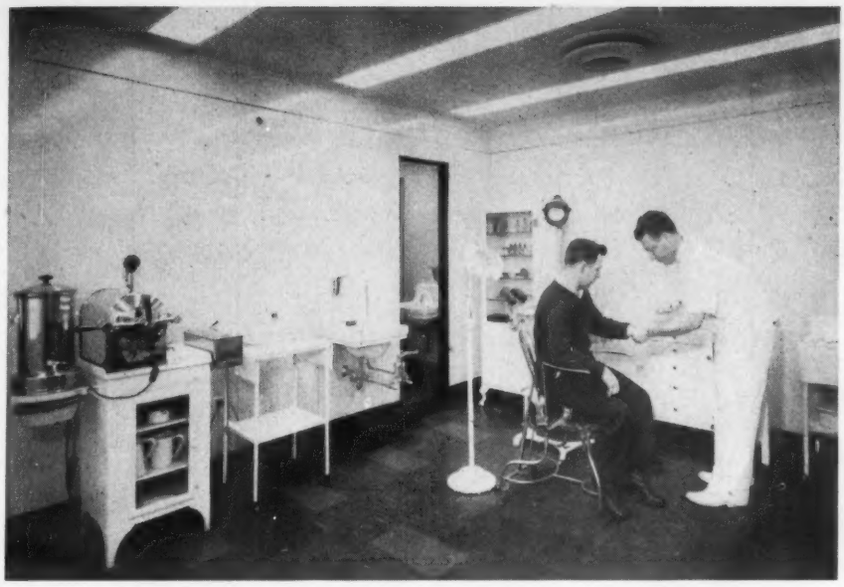
1. Immediate abrogation of the excise duty.
2. Taxation relief, particularly from income taxes.
3. Abolition of the "equalization fund" and all surcharges at present levied on iron and steel.
4. Reduction in railway rates.

Metallurgical Lab Established

A National Metallurgical Laboratory to carry out research on metals, ores, other minerals and refractories is being established at Jamshedpur. Construction and equipping of the laboratory will require five years. When completed it will contain the most modern facilities for metallurgical research, including pilot plants.

Laboratory is being established at Jamshedpur where excellent facilities will be available for the study of practical operating problems at the works of the Tata Iron & Steel Co., the Tin Plate Co. of India, the Indian Steel & Wire Products, the Indian Cable Co., the Tatanagar Foundry Co., and the Jamshedpur Engineering & Machine Mfg. Co. The Indian Copper Corp. is nearby, while most of the engineering industries are centered around Calcutta which is within easy reach of Jamshedpur. The laboratory also will be near the Fuel Research Station which is scheduled to be built in the Jharia coal fields. It will work in collaboration with the Government Metallurgical Inspectorate at Jamshedpur and with the Research & Control Laboratory of the Tata Iron & Steel Co.

As the metallurgical industry is one of the biggest consumers of refractories, research work on refractories will be one of the main functions of the laboratory and this work will be greatly facilitated by the presence of the Minerals Research Section with its specialized laboratory and pilot plant equipment.



Heppenstall employee is treated for a hand injury by one of four graduate male nurses on the staff of the company's hospital at Pittsburgh

Forging Company's Plant Hospital Provides Modern Medical Service

Heppenstall Co.'s program results in less loss of time due to infections and injuries. Staff includes medical director and four graduate male nurses. Renovated facilities has radiant heating and summer-winter air conditioning

FIRST aid dressings and minor medical attention are provided employees of Heppenstall Co., Pittsburgh, through a recently renovated 5-room plant hospital. The firm's carefully developed medical program has reduced infections resulting from accidents and resulting loss of time to a minimum and has contributed to the employees' health and well being. Concurrently, safety education programs have reduced accidents and injuries.

Heppenstall's medical program actually was started 32 years ago, when the present medical director, Dr. S. H. Johnson, was retained. From various first aid stations grew the present brick and steel plant hospital adjacent to the plant's main gates. This has been made as modern as today, and includes an emergency receiving room, treatment room, examination room, drug room and reception-vestibule. On the staff, in addition to Dr. Johnson, are four male nurses, who alternate on eight-hour shifts to cover the full work-week.

The medical building has radiant heating, summer-winter air conditioning and electric filtering. Steel cabinets for drugs, dressing, instruments and supplies are of the insulated door, ball-bearing, white-enameled type, and are built into the walls to eliminate need for in-the-room tables and cabinets. Walls are of transite material and have been finished by an automobile painting company in deep cream and soft blue. Liberal use of glass block in windows assures privacy and guards against infiltration of dirt and soot.

Although the plant hospital is equipped to perform operations of an emergency nature, medical policy is to dispatch, whenever possible, serious cases to the neighboring West Penn hospital, where arrangements have been made to provide employees with x-ray, surgery and all care of general hospitalization. When necessary, such as in cases of eye injury, Heppenstall workers are sent to specialists for diagnosis and treatment.

Only Shipments of Iron and Steel Top Aluminum in 1946

The nation's volume of aluminum shipments in 1946 was second only to that of iron and steel shipments in the same period, according to the 1946 annual report of Aluminum Co. of America, Pittsburgh.

The report, signed jointly by Arthur V. Davis, chairman of the board, and Roy A. Hunt, president, outlined what the company has been doing in the way of an expansion program to catch up with the tremendous demand for basic aluminum. A new sheet and plate mill is under construction at Davenport, Ia., and is scheduled to start operations before the end of the year, the report stated. A die-casting plant is being built at Hillside, Ill., near Chicago, and an extrusion plant at Cressona, Pa., which the company constructed and operated for the government during the war years, has been purchased from War Assets Administration. In addition, a plant at Richmond, Ind., was purchased as headquarters for Aluminum Seal Co., a subsidiary.

These new plants, together with modernization of existing plants, will increase the company's peacetime manufacturing capacity for mill and fabricated products by about 20 per cent.

The firm's consolidated net income for 1946, after deducting all expenses incident to operation, taxes, depletion and depreciation, and including the refundable portion of prior years' taxes arising from unused excess profits tax credit, amounted to $23,964,930. The comparable figure for 1945 was $19,951,462.

Australian Firm To Produce National Malleable Products

National Malleable & Steel Castings Co., Cleveland, has licensed Industrial Steels Ltd., Sydney, Australia, to manufacture the Cleveland company's patented carcouplers, freight car trucks, draft gears and other railway specialties. The Sydney firm is participating in the $300 million program to modernize the Australian railway system.

Leon Greenberg, managing director of Industrial Steels Ltd., who has been in Cleveland to negotiate the contracts, says that the Australian railways are a conglomeration of seven systems with four different widths of track. Mr. Greenberg also reported that his company plans to introduce to the Australian motor car industry National Malleable's automotive castings, adding that National Malleable engineers will design an iron foundry for his firm in Sydney.

Republic Ships 580,000 Net Tons of Steel During March

Shipment of steel from the plants of Republic Steel Corp., Cleveland, approximated 580,000 net tons for March, which topped the previous record of 541,884 tons established in March, 1941. Two of Republic's 21 blast furnaces produced 45,000 tons of iron each, a figure never before achieved by any of the corporation's furnaces, and rarely equaled by any other in the country. The Cleveland No. 5 cast 46,000 net tons of pig iron during the month and the Warren, O., furnace turned out 45,000 net tons.

They mean the same in steel

N-A-X HIGH-TENSILE is synonymous with SAE 950 at its best. It is recommended by a long record of successful applications which involve severe forming operations, severe service conditions. When specifications call for SAE 950, get the full benefits of N-A-X HIGH-TENSILE'S *proved* properties: 1) High strength. 2) Finer grain structure. 3) Good formability. 4) Excellent weldability. 5) High fatigue-resistance. 6) Great impact toughness. 7) High corrosion-resistance. N-A-X HIGH-TENSILE has all seven—keeps all seven.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Death of Henry Ford at 83 recalls fantastic story of building of huge automotive empire. Question of effect of inheritance taxes on estate and future management of company, wholly owned by Ford family, as yet unanswered

DETROIT

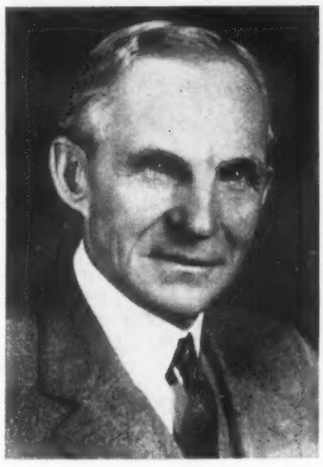
DEATH OF the 83-year old founder of Ford Motor Co. last Monday was not unexpected. It had been known for a year he was suffering off and on from an illness which eventually must prove fatal. Yet his passing moved everyone to thoughts of his tremendous accomplishments since the incorporation of his empire nearly 44 years ago. Scarcely anywhere around Detroit can you fail to notice some landmark, some silent testimony to his achievement, other than automobiles, whether it be an endowment of the Ford family itself or of some others who were made rich and famous from the profitable operations of the company in its early days.

Mr. Ford was a firm believer in reincarnation and the perpetuity of human life. His departure from this life had its bizarre touches. The great Ford estate at Dearborn was without heat, light or telephone service as the result of inundation of the area by the flooded Rouge river. Kerosene lamps and candles reinforced the flickerings from fireplaces. The house was empty save for Mrs. Ford, a woman servant and the family chauffeur. Mr. Ford awakened from his sleep at 11:15 p. m. complaining of a headache and dry throat. Mrs. Ford dispatched the chauffeur to the nearby Ford engineering laboratories where he was able to reach a doctor at Ford hospital by an emergency call. However, Mr. Ford died at 11:40 before anyone could reach his side.

Started with $50,000

Repetition of the fantastic history of the Ford company would be tiresome here. The story has been told too often. Suffice it to recall the operation was started by Henry Ford when he was 40, with 12 original stockholders holding 1000 shares of stock, of which 51 per cent was held by Ford and his coal dealer friend, Alex Y. Malcomsen. Cash paid into the original venture probably did not exceed $50,000.

Annual company statement filed last December with the Massachusetts Tax Commission reported assets of over $718 million, including cash and other collateral of over $230 million, real estate of over $143 million, machinery $200 million, merchandise and supplies $142 million, and prepaid insurance and taxes of about $800,000. Reported surplus was in excess of $162 million. Company holdings are exclusively in the hands of the Ford family and the Ford Foundation. Stock is divided between voting and nonvoting types, all the former being held by the Ford family. Exact distribution is not known, although one estimate is that over 50 per cent of the voting stock was held by the elder Fords. What steps have been taken to minimize the effect of terrific inheritance taxes on an estate of this magnitude are not known, but it is believed this contingency was anticipated and provided for many years ago by the Ford legal staff. Details will become known after filing of the Ford will for probate in a week or two.



HENRY FORD

Mr. Ford had an uncanny knack for doing the right thing and saying the right thing when it came to building motor cars, and a similar uncanny knack for doing just the opposite when it came to public utterances and activities in world affairs, economics, politics and the like. On the latter score he was in hot water many times, yet in the long run his own embarrassment probably was counterbalanced by the valuable publicity accruing to the company.

His connection with company affairs terminated officially in September, 1945, when at the age of 82 he had served far beyond the allotted time of practically all manufacturing giants, whatever their industry. Up to this date, his tirelessness and agility were marvelous to behold. The story is often told of his rushing into the engineering laboratory of a morning, bent on some idea which had occurred to him earlier, and actually hurdling a low fence in front of the building so anxious was he to get inside.

New Generation in Control

Today the Ford story is that of an entirely new generation, thinking in different ways and guided by far different destinies. While the family retains ownership, it is not inconceivable that public participation in ownership could come, despite firm denials of such an eventuality by those now directing the company. There has come a thorough shaking down of the organization, reconstitution of executive personnel, disposal of unprofitable phases of operation, which were numerous, persistent searches into costs and cost-saving techniques, humanizing of employee relations and many other changes still to be reflected in the product itself. Many persons around Detroit refer to the new Ford management as "the kids." with no offense whatever intended.

Whether you like it or not, you must recognize Ford was the pacemaker of the automotive industry throughout the years, particularly the earlier years. Always the individualist and never the

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

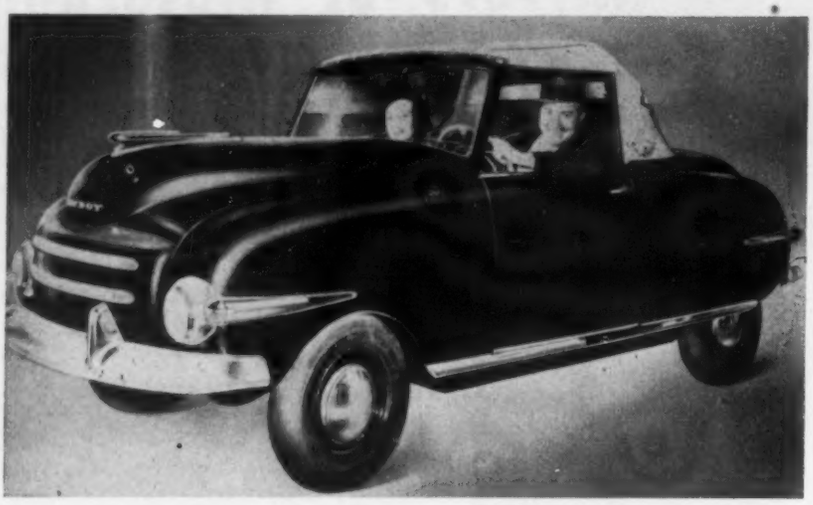
	1947	1946
January	373,872	126,082
February	399,082*	84,109
March	437,303*	140,738
April	.....	248,108
May	.....	247,620
June	.....	216,637
July	.....	331,000
August	.....	359,111
September	.....	342,969
October	.....	410,510
November	.....	380,664
December	.....	380,908
12 ms.	.....	3,268,456

* *Preliminary.*

Estimates for week ended:

Mar. 22	108,472	37,285
Mar. 29	100,355	43,070
April 5	102,478	47,735
April 12	98,000	50,425

(Material in this department is protected by copyright and its use in any form without permission is prohibited)



NEW LIGHT CAR: Playboy Motor Car Mfg. Corp., Buffalo, has introduced the new Playboy, incorporating rear engine, full 4-wheel independent suspension, automatic drive, no clutch pedal, no gear shifting. The convertible style car has overall length of 13 ft, a height of 54 in., and will sell for approximately $950

collaborationist, both in production and in merchandising, Ford drove through to his preconceived goals, whatever the cost, and in the long run usually convinced his competitors they had best do likewise.

What the automobile industry or all U. S. industry for that matter has learned on the score of producing more for less money and thereby broadening markets had its genesis in the Ford saga. Certainly this cannot and should not be forgotten until time has erased the last remnants of western civilization. The lesson to be learned by oncoming generations is of incalculable value.

Stamping Shop Near Completion

A $5 million stamping shop which will chew up an estimated 15,000 tons of steel a month, will begin production within 30 days at Willys-Overland Motors Inc., Toledo, O. About 25 of a total of 53 presses ranging up to 1400-ton capacity have been installed, and the entire project should be completed within 90 days, work having been started last July and encountering many delays.

Presses are housed in a building providing 135,000 sq ft of floor space, and before the equipment could be erected it was necessary to elevate the roof 12 ft and install a concrete pit 700 ft long and 20 ft deep to house utility lines and a scrap conveyor belt serving the presses.

Largest press in the battery weighs 300 tons, measures 47 feet from bottom to top. It will be capable of producing complete stampings for a passenger car body, including roof panel, fenders, hoods and other miscellaneous pressed steel parts. The plant will produce units for the forthcoming Willys passenger car, as well as for a jeep truck line soon to be in production. Included in the expansion program, part of the Willys overall $21 million improvement, will be a new die shop, serviced by a 40-ton crane, as well as one 15-ton and three 10-ton units.

More "Spring Models"

So-called "spring models" of both Lincoln and Mercury cars have been announced, supplementing similar versions of the Ford line mentioned here last week. Embellishments added to the Lincoln include a new chromium hood ornament superimposed on a brass sphere; replacement of die-cast nameplates on the hood sides with modern script; restyling of hubcaps, and use of pull-out type exterior door handles in place of the former pushbutton type. New interior colors covering instrument panels and garnish moldings are featured, as well as ten new exterior colors, including a number of metallic lusters.

A new chrome-plated grille frame, adding to massive appearance of the front-end design, is the principal feature of the restyled Mercury, now being assembled at a rate of 500 daily. Instrument panel dials have been redesigned, interior trim retailored, new nameplates added to hood sides and rear deck, and 11 new exterior colors added to the line.

Plymouth Cuts Prices

Reduction in Plymouth prices, in amounts from $25 to $55, announced last week, was well-timed to coincide with government suggestions to manufacturers to effect price reductions, and as such Chrysler stood to receive a good measure of acclaim for the move. Actually, the price adjustment may have been motivated primarily to bring Plymouth prices more in line with those of its principal competitors, Ford and Chevrolet, particularly the latter. Last December, it may be recalled, Chevrolet pointed out that even with the $100 increase which General Motors effected in all its models it would still be underselling comparable Ford and Plymouth models. With the return of competitive market conditions sooner or later a certainty, now may have seemed the propitious moment to announce a Plymouth price reduction. It is unlikely the change resulted from any savings in materials, manufacturing or labor costs, which continue to point upward, since almost simultaneously with the Plymouth announcement, Hudson posted increases of $25 to $39 each on its models because of "increased materials costs."

The price jockeying among the three lowest-priced producers is interesting in that it may forecast the imminence of sharpened efforts to attract buyers, despite the flood of publicity coming from the industry to the effect backlogs are still sufficient to absorb production for anywhere up to a year. What should prove to be a sound indication of buyer resistance to current prices—sales levels of low-mileage used cars—does not yet reflect much of a change. These models are still selling in excess of delivered price, possibly because used-car dealers remain confident of a strong spring market able to stand these prices, and are unwilling to move them for less than they paid for the cars some weeks ago. That someone is going to get burned plenty in the 1946 and 1947 model used-car market looks surer every day.

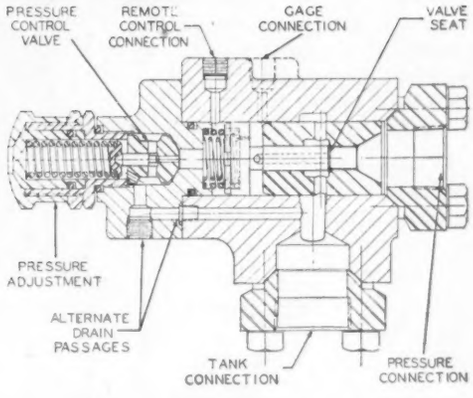
Wage Presentation Delayed

Last Tuesday was the date originally set for unveiling of the latest "economic brief" of the UAW-CIO in the effort to demonstrate how wages could be raised 23½ cents per hour within the limits of present production costs and prices. Walter Reuther, union president, was to have made the presentation, to which the local press had been invited. A telephone cancellation of the program came through last Monday, however, with the added information the affair had been postponed to the week of Apr. 21. No explanation was given for the delay.

Negotiations on wages between the UAW and General Motors were slated to resume late last week. Chrysler discussions are continuing under a third 30-day extension. Conversations at Ford are expected about Apr. 25.

Patents Pending

What do You Want in an EXTREME PRESSURE RELIEF VALVE?



- ☐ Quiet Operation at Pressures up to 5000 psi
- ☐ Accurate Maintenance of Pressure Setting
- ☐ Instantaneous Action Preventing Objectionable Pressure Peaks
- ☐ Pressure Adjustment from 50 psi to 5000 psi
- ☐ Provision for Remote Control and Unloading
- ☐ Perfect Hydraulic Balance
- ☐ Zero Leakage
- ☐ Rugged, Fool-Proof Construction

THIS NEW 5000 psi Relief Valve will put an end to the squeal and chatter problems in your hydraulic equipment.

No matter what your relief valve problems are, Superdraulic can help you. Send for data folder giving complete technical description.

Information on Superdraulic 5000 psi Pumps, Motors, Transmissions, Valves or Controls furnished on request.

Superdraulic Corporation

HYDRAULIC PUMPS • MOTORS • TRANSMISSIONS • VALVES

MILLER AT FORD ROAD • DEARBORN, MICHIGAN

HYDRAULIC BALANCE FOR LIFE ▲ HYDRAULIC BALANCE FOR LIFE ▲ HYDRAULIC BALANCE FOR LIFE ▲ HYDRAULIC BALANCE FOR LIFE ▲ HYDRAULIC BALANCE FOR LIFE ▲ HYDRAULIC BALANCE FOR LIFE ▲

Sharon Steel Forms New Tube, Strip Subsidiary

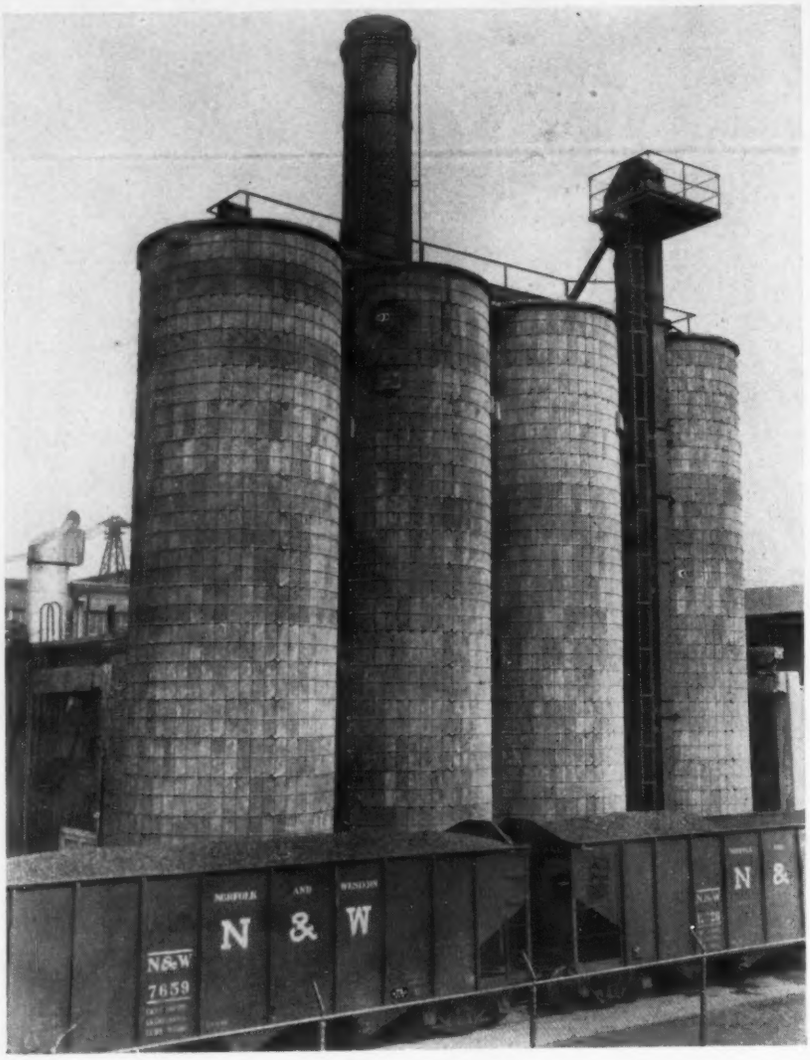
Detroit Tube & Steel Co. set up by Bopp Steel and Detroit Seamless Steel Tubes merger. Warehousing firm established

ESTABLISHMENT of Detroit Tube & Steel Co. by merger of Detroit Seamless Steel Tubes Co. and Bopp Steel Corp. has been announced by Sharon Steel Corp., Sharon, Pa. The new company, which has its headquarters in Detroit, will operate as a wholly owned Sharon subsidiary.

Formation of the new company places Sharon actively in the Detroit market as a steel producer with an annual capacity of about 100,000 tons of seamless tubing and cold-rolled strip.

Sharon's operations in Detroit have been further expanded by the establishment of a steel warehouse, Sharonsteel Products Co., which will carry all the steel products of Sharon Steel and its affiliates, which include the plants at Detroit, the Niles Rolling Mill Co., Niles, O., and the Brainard Steel Division at Warren, O.

Administration of the manufacturing and warehouse operations of the new companies will be under the same group of officers, who are: A. J. Bopp, chairman; Henry A. Roemer Jr., president; H. L. Maher, J. H. Dunbar and J. J. Kraus, vice presidents; F. R. Taylor, secretary-treasurer; and A. G. Erickson, assistant secretary-treasurer.



COAL SILOS: More than one fourth the coal used annually to heat the Superior Engine Division of National Supply Co. can be stored in these four new concrete silos. They are National Supply's answer to threats of coal strikes

Allegheny Ludlum Expects Record Stainless Output

Allegheny Ludlum Steel Corp., Pittsburgh, expects to attain record production of stainless steel during 1947. Last year the company produced 140 million pounds, largest since it first produced stainless in 1920 in which year it turned out 30,000 pounds. This year the company expects to boost output to 190 million pounds.

Overall picture for the company in 1947 is bright, according to the annual pamphlet report to stockholders. While Chairman W. F. Detwiler and President H. G. Batcheller note a softening in demand in some quarters, with here and there a customer appearing to have cut deeply into working capital by overloading inventories, nevertheless, they feel that, provided other conditions permit, Allegheny Ludlum is assured of capacity operations through 1947.

"The future of high alloy steel seems to be virtually unlimited," state Messrs. Detwiler and Batcheller in their letter to stockholders. "Every year our scientists discover combinations of elements to produce new and better alloys. Every year new processes are developed for the more economical manufacture of alloy steels now being used."

Allegheny Ludlum engineers have developed a new process for the use of oxygen to reduce the carbon content of alloy steels produced in open-hearth furnaces. Begun in August last year, work on the process has progressed to a point where marked savings in cost and time are apparent.

The company also reports several new developments in the processing of stainless steel in the electric furnace promise to provide for more efficient and economic production. Experiments, in cooperation with a customer, begun in 1945, culminated late last year in production of coal mining bits tipped with Carmet (tungsten-carbide).

Stock of Fitzsimons Co. Sold to New York Firm

All American Industries of New York has bought all the stock of Fitzsimons Co., Youngstown, producer of cold-drawn steel. Officials of Fitzsimons said there would be no changes in personnel and a large expansion is planned.

Portsmouth Steel Plans Wire Plant Expansion

Elmer A. Schwartz, president, Portsmouth Steel Corp., Portsmouth, O., last week announced a $1 million major improvement program to make fine drawn wire and wire specialties. Installation of new high speed wire equipment is under way.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

John A. Roebling's Sons Co., Trenton, N. J., has completed plans for erection of a 10-mile long monocable aerial tramway paralleling the main ridge of the Andes mountains in Peru. The tramway was designed for Cerro de Pasco Copper Corp. in order to move ore to a railway terminus.

—o—

Lincoln Electric Co., Cleveland, manufacturer of electric arc welding equipment, announces that its dealer for Texas, Big Three Welding Equipment Co. Inc., has opened an office in Dallas.

—o—

Libbey-Owens-Ford Glass Co., Toledo, O., reports that the government ban on use of uranium for glass-making will have no effect on its operations as other metals and oxides of rare metals have been developed in manufacturing structural glass in which uranium was formerly used to obtain an ivory color.

—o—

American Foundrymen's Association, Chicago, reports an all-time high in membership of 9364.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, has ordered a third edition of 25,000 copies printed of its *Simple Ways to Better Cleanliness*, a school instruction manual describing the operation of household washers, dryers and ironers.

—o—

Koppers Co. Inc., Pittsburgh, has developed a maltose syrup as a substitute for sugar, formerly used as a reducing agent in solutions for plating porous chrome piston rings.

—o—

Glidden Co., Cleveland, paint manufacturer, announces that it is prepared to license petroleum manufacturers who wish to employ the lecithin patents in the production of motor fuels and lubricating and cutting oils.

—o—

Preco Corp., Bellingham, Wash., has purchased a plant at Lake Washington shipyards for $75,000 from WAA. The firm plans to prefabricate housing units.

—o—

Davey Compressor Co., Kent, O., has appointed New Orleans Armature Works, New Orleans, as distributor of the firm's line of industrial compressors for Louisiana and Mississippi.

—o—

Foundry Educational Foundation, Cleveland, representing members of the foundry industry of the nation, will give 50 scholarships next fall to students who will take foundry courses offered by Case Institute of Technology, Cleveland, Cornell University, Ithaca, N. Y., Massachusetts Institute of Technology, Cambridge, Mass., University of Cincinnati, Cincinnati, and University of Wisconsin, Madison, Wis.

—o—

Stinson Division, Wayne, Mich., Consolidated Vultee Aircraft Corp., is now producing its flying station wagon in volume for spring and summer delivery.

—o—

Colt Patent Fire Arms Mfg. Co., Hartford, Conn., is applying for a change of corporate name to Colt's Mfg. Co. since the firm's production is now largely concentrated on the manufacture of plastics and washing machines.

—o—

Ritter Co. Inc., Rochester, N. Y., manufacturer of medical and dental equipment and electrostatic separation machinery, reports a 1946 net profit of $696,396 compared with $547,300 in 1945. Sales for 1946 increased 17 per cent over the previous year.

—o—

Kaiser-Frazer Corp., Willow Run, Mich., has signed an agreement with RFC for an option to extend its lease for ten years on the Willow Run plant and has also leased an additional building there which will house its small parts department.

—o—

Consolidated Vultee Aircraft Corp., San Diego, Calif., will discontinue operating its Vultee Field Division, Downey, Calif., about July 1 because of cancellation of the YO-81 contract and the poor outlook for obtaining replacement business at this division.

—o—

B. F. Goodrich Co., Akron, will expand tire manufacturing facilities at its Miami, Okla., plant. A $1 million expenditure in equipment and remodeling is expected to boost production by about 16 per cent.

—o—

Formica Insulation Co., Cincinnati, manufacturer of laminated materials, has nearly completed a three-story addition to its main plant which will add 4800 sq ft of working space.

—o—

Cleveland Pneumatic Tool Co., Cleveland, which recently sold its Pneumatic Tool Division, plans to produce farm tractors and ball bearing screw units.

—o—

Moore Division, Chicago, Conlon-Moore Corp., announces that volume production is scheduled for May on its smokeless coal heater.

—o—

United Aircraft Corp., East Hartford, Conn., will re-establish its engineering training program for the Chance Vought Aircraft Division which will select 50 engineering students this spring for training in the firm's shops and laboratories.

—o—

United States Rubber Co., New York, has signed a long-term lease on a Chicago plant for production of plastic materials. Manufacturing operations will start about July 1.

—o—

Twin Coach Co., Kent, O., delivered 145 busses during March, largest monthly total in the firm's 21-year history.

—o—

Johns-Manville Corp., New York, has purchased Goetze Gasket & Packing Co. Inc., New Brunswick, N. J., manufacturer of metallic gaskets. The product will be produced as formerly under the Goetze name.

—o—

Lindberg Engineering Co., Chicago, manufacturer of heat treating furnaces and electrical equipment, and Fisher Furnace Co., Chicago, manufacturer of nonferrous melting furnaces, refractories and blowers, have united. The Fisher firm will be known as Fisher Furnace Division. First development of the new organization is an induction melting furnace.

—o—

Cochrane Corp., Philadelphia, manufacturer of water conditioning equipment, has named Herbert H. Haas, Cincinnati, as representative for southwestern Ohio and eastern Kentucky, and William Z. Harrison, Salt Lake City, Utah, as representative for Utah, Montana, Idaho and eastern Nevada.

—o—

Electric Auto-Lite Co., Toledo, O., has bid $2 million for the government-owned plant in Westover, N. Y., where it proposes to manufacture electric generators and starters for automobiles and airplanes. During the war the facility was operated by Remington Rand Inc. for the manufacture of propellers.

—o—

Midland Steel Products Co., Cleveland, manufacturer of auto stampings and pressed steel parts, will soon install a 3000-ton capacity side rail press in its Cleveland plant. This is part of a $1,100,000 expansion program which also includes moving the firm's Power Brake Division to its Detroit plant.

—o—

Pullman-Standard Car Mfg. Co., Chicago, announces that deliveries of freight cars from its plant at Michigan City, Ind., have doubled the 1946 average.

The Business Trend

Work Stoppages Push Industrial Index Down

TEMPO of industrial activity, which was slowed in the week ended Apr. 5 by a miners' work stoppage and work suspensions on Good Friday, was being choked down even further last week by continuation of the miners' inactivity and a telephone employees' strike.

Declining 4 points in the week ended Apr. 5, STEEL's industrial production index receded to 156 per cent of the 1936-1939 average, after having fallen from a postwar high of 164 per cent in the week ended Mar. 22 to 160 per cent in the week ended Mar. 29.

STEEL—For the second consecutive week steel ingot production continued at the postwar record pace of 97 per cent of capacity in the week ended Apr. 5. However, prolongation of the coal miners' work stoppage will bring about a curtailment of steel operations and delay the day that the supply of steel, particularly flat-rolled products, can be brought into balance with demand.

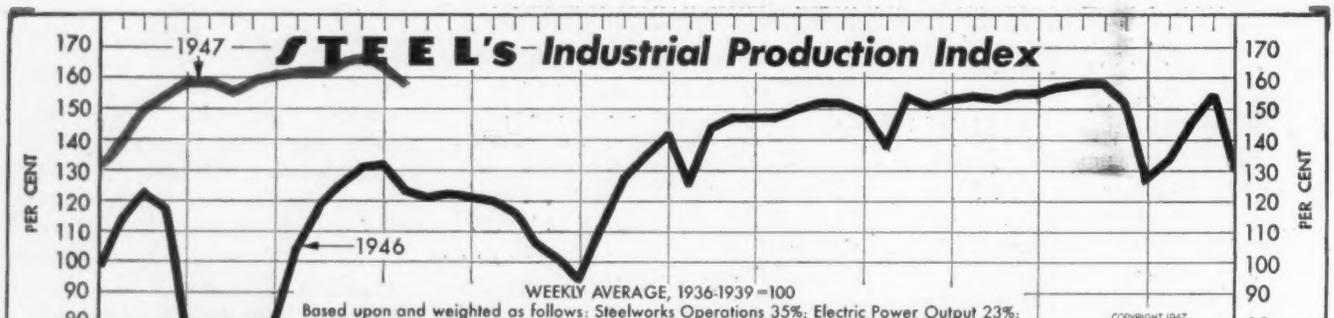
CAR LOADINGS—Cut sharply by the mine work stoppage is freight car loadings, for normally around 20 per cent of the total loadings consist of coal. Just before the mine work stoppage began the Association of American Railroads had reported that freight car loadings in the second quarter of this year were expected to be 33.2 per cent above those of the same period in 1946. Greatest increases were expected in loadings of ore and concentrates, coal and coke, and automobiles and trucks.

AUTOS—Automobile production which had declined in the week ended Mar. 29 due to a blizzard rose moderately to an estimated 102,478 passenger cars, trucks and busses in the week ended Apr. 5. This output was comprised of 71,860 passenger cars and 30,618 trucks. A combination of adverse conditions prevented the production from more nearly approaching the postwar high of 108,472 total units attained in the week ended Mar. 22.

PRICES—Another step upward was recorded in the Bureau of Labor Statistics wholesale price average during the week ended Mar. 29. The rise put the index at 149.4 per cent of the 1926 average, compared with 149 in the week ended Mar. 22 and 108.7 a year ago.

CONSTRUCTION—Belief that prices in the construction industry have reached their peak has been voiced by 53 per cent of 268 general contractors polled by the F. W. Dodge Corp. In some areas, notably New England, the South Atlantic states and the East South Central states, opinion was preponderant, at least 2 to 1, that costs had attained their peak. Only in the Pacific states was opinion general that the summit has not been reached.

EMPLOYMENT—Continued gains in industrial activity were accompanied by a rise in factory employment in February to an estimated 15,114,000, a new postwar high. In January the figure was 15,048,000. Gains were concentrated in the durable goods groups, paced by the automobile industry. However, with the advent of spring, a well sustained demand for labor may be expected in many fields, the U. S. Department of Labor said.



The Index (see chart above): **Latest Week (preliminary) 156** **Previous Week 160** **Month Ago 160** **Year Ago 123**

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	97.0	97.0	93.0	81.5
Electric Power Distributed (million kilowatt hours)	4,693	4,729	4,787	3,988
Bituminous Coal Production (daily av.—1000 tons)	2,023	2,147	2,146	2,214
Petroleum Production (daily av.—1000 bbls.)	4,850‡	4,865	4,824	4,446
Construction Volume (ENR—Unit $1,000,000)	$130.8	$60.1	$127.9	$131.0
Automobile and Truck Output (Ward's—number units)	102,478	100,355	104,378	47,735

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons. ‡ Preliminary.

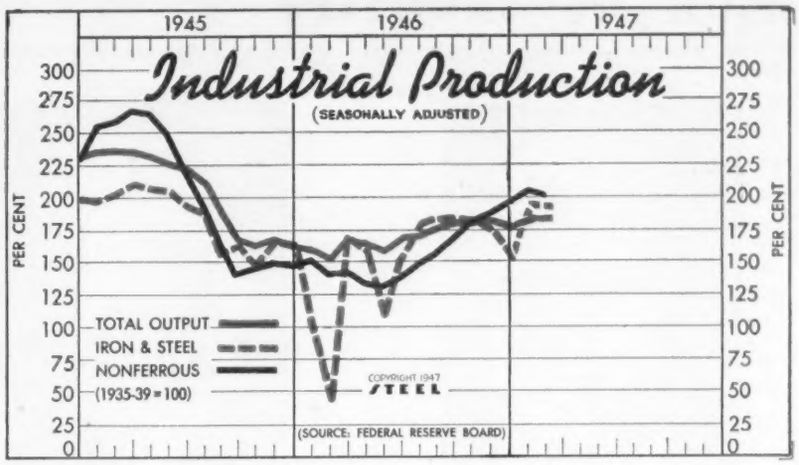
TRADE				
Freight Carloadings (unit—1000 cars)	690†	829	806	645
Business Failures (Dun & Bradstreet, number)	71	63	58	19
Money in Circulation (in millions of dollars)‡	$28,247	$28,170	$28,335	$27,912
Department Store Sales (change from like wk. a yr. ago)‡	+10%	+12%	+10%	+12%

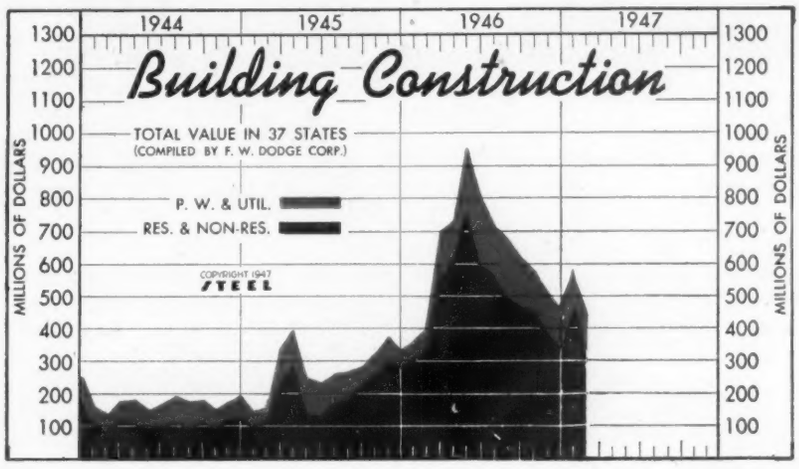
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	188	160	192	102	203	151
Feb.	188	152	191	43	202	139
Mar.	...	168	...	169	...	141
Apr.	...	165	...	159	...	132
May	...	159	...	109	...	130
June	...	170	...	154	...	137
July	...	172	...	179	...	148
Aug.	...	177	...	183	...	156
Sept.	...	180	...	184	...	167
Oct.	...	181	...	183	...	179
Nov.	...	182	...	177	...	187
Dec.	...	181	...	159	...	195
Ave.	...	171	...	150	...	155





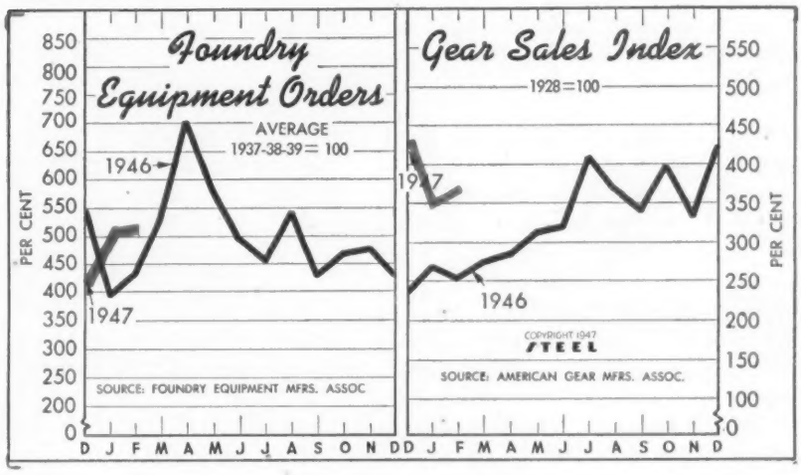
Construction Valuation in 37 States

(Unit—$1,000,000)

	Total	Public Works-Utilities		Residential and Non-residential	
	1947	1947	1946	1947	1946
Jan.	571.6	113.9	50.2	457.7	307.3
Feb.	442.2	90.5	64.7	351.6	322.7
Mar.	....	....	143.6	....	554.0
Apr.	....	....	128.1	....	606.8
May	....	....	197.9	....	754.6
June	....	....	202.5	....	605.5
July	....	....	153.1	....	564.9
Aug.	....	....	184.4	....	495.6
Sept.	....	....	156.4	....	463.5
Oct.	....	....	112.8	....	460.4
Nov.	....	....	121.8	....	382.0
Dec.	....	....	115.9	....	341.4
Total	....	....	1,631.4	....	5,858.7

Foundry Equipment Orders and Gear Sales

	Foundry Equipment Orders (Index, 1937-38-39=100)			Gear Sales (Index, 1928=100)		
	1947	1946	1945	1947	1946	1945
Jan.	513.4	392.8	422.4	350	269	323
Feb.	521.9	432.8	465.3	376	253	331
Mar.	....	536.6	604.7	...	275	339
Apr.	....	701.2	325.0	...	284	296
May	....	577.3	404.7	...	313	309
June	....	491.7	375.4	...	321	271
July	....	453.4	411.7	...	407	264
Aug.	....	538.7	532.2	...	368	205
Sept.	....	424.4	577.2	...	342	213
Oct.	....	469.2	457.8	...	397	251
Nov.	....	477.4	416.6	...	336	255
Dec.	....	430.9	547.6	...	425	239
Ave.	....	493.9	461.7	...	332	275



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,261	$12,913	$13,958	$13,004
Federal Gross Debt (billions)	$257.9	$259.2	$260.7	$274.5
Bond Volume, NYSE (millions)	$13.0	$17.6	$19.9	$25.0
Stocks Sales, NYSE (thousands)	3,120	4,448	5,321	8,127
Loans and Investments (billions)†	$55.2	$55.5	$55.1	$66.0
United States Gov't. Obligations Held (millions)†	$34,695	$35,258	$34,790	$46,818

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.73	$63.54
All Commodities†	149.4	149.0	146.4	108.7
Industrial Raw Materials†	165.5	164.3	158.9	121.1
Manufactured Products†	143.3	143.1	142.0	104.5

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

C. DONALD DALLAS

JAMES J. RUSSELL

ALBERT E. ZEISEL

C. Donald Dallas, president, Revere Copper & Brass Inc., New York, has been elected chairman of the board of directors of the corporation. He is succeeded as president by **James J. Russell,** formerly vice president, secretary and treasurer of the company. **Breck Aspinwall** has been elected secretary, and **A. E. McCormick,** treasurer. **Charles A. Macfie,** for many years a vice president of the company, in charge of merchandise sales, has been appointed general sales manager. **Cornelius C. Felton,** also a vice president for many years, has been appointed assistant to the chairman of the board.

—o—

G. W. Christopher, Youngstown Sheet & Tube Co., Youngstown, has been appointed manager of standard pipe sales, and **J. W. Owings,** manager of oil country tubular sales.

—o—

Glenn W. Malme, formerly advertising manager for Southern California plants, Western Gear Works, Lynwood, Calif., has been promoted to sales promotion manager for all three plants of Western Gear Works and Pacific Gear & Tool Works. He will retain his offices in Los Angeles.

—o—

Robert G. Marquardt has been appointed vice president in charge of domestic sales, American Type Founders Sales Corp., Elizabeth, N. J. He was formerly manager of the company's Cincinnati branch.

—o—

Walter J. Kohler Jr. has been elected president, Vollrath Co., Sheboygan, Wis. He has resigned his position as secretary of the Kohler Co., Kohler, Wis. Other officers elected are: **J. M. Detling,** chairman of the board and treasurer; **J. C. Vollrath,** vice president; **R. P. Vollrath,** secretary; and **H. E. Schroeder,** assistant secretary-treasurer.

—o—

Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., has been elected chairman of the board of directors, and **Jerome A. Raterman,** formerly executive vice president, has been named president. Mr. Whipp succeeds the late **F. P. Thedieck** as chairman of the board. **D. H. McKellar** has been re-elected vice president, and **F. C. Dull,** secretary and treasurer. Those re-elected to the company's board of directors include **Mr. Whipp** and **Mr. Raterman, F. C. Dull, E. J. Griffis, Val Lee, Philip G. Wagner, L. Cable Wagner, W. W. Weis, Jesse G. Wright, D. A. Hawley, O. Lee Harrison,** and **James T. Wilson.**

—o—

Raymond E. Horn, vice president and director of sales, Abbott Laboratories, Chicago, has been elected president and general manager. He succeeds the late **Rolly M. Gain. Alfred W. Bays,** secretary and general counsel, has been named vice chairman of the board, and will continue as secretary.

—o—

George Hockstein, sales manager, Heating & Water Systems Division, Heil Co., Milwaukee, has been elected a member of the board of directors. He has also been appointed to the executive committee of the Oil Heat Institute of America, New York, and is a member of the marketing committee of the National Warm Air Heating & Air Conditioning Association.

—o—

Glen McDaniel, general counsel, RCA Communications Inc., has been elected vice president and general attorney. **W. W. Watts,** vice president in charge of the Engineering Products Department, RCA Victor Division, has been elected a director of Radiomarine Corp. of America, New York.

—o—

Albert E. Zeisel has been appointed vice president in charge of sales, Eutectic Welding Alloys Corp., New York. He has been assistant to the president in charge of sales, with headquarters in the New York office. **T. H. Leston** has been appointed chief engineer of the corporation's new New York plant.

—o—

C. J. Haring has been named general sales manager of the J. D. Adams Mfg. Co., Indianapolis. He succeeds **V. E. Trimble,** who died recently. Mr. Haring has been associated with the company since 1929, and was recently Eastern Division sales manager in charge of territory east of the Mississippi river.

—o—

A. John Bodenmuller has been named sales manager of Traubee Products Inc., Brooklyn, N. Y. He had been connected with Westinghouse Electric Corp. in Mansfield, O.

—o—

E. A. Goddard, vice president and general manager, Goddard & Goddard Co., Detroit, has been elected president and general manager of the company. He succeeds his father, **A. N. Goddard,** founder of Goddard & Goddard Co., as president. **L. H. Goddard** has been elected vice president, and will continue his activities in the sales field. **H. C. Henderson** has been re-elected secretary-treasurer, and **S. H. Grattan** re-appointed general sales manager. **A. N. Goddard** will continue his activities with the company as chairman of the board.

—o—

D. J. O'Conor Jr., assistant chief engineer, Formica Insulation Co., Cincinnati, has been elected a vice president and

IF YOU NEED STEEL...

Is this talk about steel scrap shortage "old stuff"?

Not when you hear a veteran open-hearth superintendent say this:

"We are losing ground every day. There was a bad shortage of steel scrap during the war, but now it's much worse. I'm not exaggerating when I say that steel mill scrap piles are ***now at their lowest ebb in the history of the industry.***"

There can be only one result — less steel for your needs.

(In normal times steel mills carry their highest scrap inventories from January to April.)

★ ★ ★ ★

Some steel mills have been forced to bank furnaces. Others are using abnormally high percentages of pig iron when the furnaces are "charged." This means longer refining time . . . lower production. Normally, about one-half ton of steel scrap is used for every ton of steel ingots produced.

YOU CAN HELP

There is only *one* possible solution—MORE SCRAP!

You can help hurry it to the steel industry through your regular channels by appointing an energetic supervisor to clean out the scrap "boneyards" in your plants and properties. These may include unused or obsolete equipment and machines — anything unusable that is made of iron or steel.

Then the scrap should be separated into ferrous and non-ferrous metals. A hurry call to your scrap dealer will do the rest. Help keep steel rolling! The American Rolling Mill Company, 1101 Curtis Street, Middletown, Ohio.

The shipping date may depend on your scrap pile!

assistant to the president, and a director of the company. He is a son of **D. J. O'Conor,** co-founder and president. **John D. Cochrane Jr.,** a chemical engineer, associated with Formica's research department for 22 years, has been named director of the company's research development department.

—o—

Edgar F. Schaefer, executive vice president, Gardner-Denver Co., Quincy, Ill., has been elected president. He succeeds **H. G. Myers,** who was promoted to chairman of the executive committee.

—o—

Elmer Schneider has been elected vice president and director of engineering, Wheelco Instruments Co., Chicago. In this position, newly created by the company, Mr. Schneider will take complete charge of all engineering activities, including inspection and approval of quality standards. **Joseph A. Reinhardt** has been named plant manager, responsible for all manufacturing operations.

—o—

Frederick W. McIntyre Jr. and **Charles H. Carswell** have been elected to the board of directors, Reed-Prentice Corp., Worcester, Mass. Mr. McIntyre is vice president of the company and Mr. Carswell is treasurer of the Universal Winding Machine Co., Providence, R. I. **Donald H. Dalbeck** has been re-elected treasurer.

—o—

Edwin E. Van Cleave has been appointed sales engineer for the Railway Equipment Division, American Welding & Mfg. Co., Warren, O. He will handle railroad equipment applications in the Chicago district. He was formerly associated with the Champion Hand Brake Co. and the Ajax Hand Brake Co., Chicago.

—o—

Felix E. Wormser has resigned as secretary and treasurer of the Lead Industries Association, New York, and has been appointed assistant to the president, St. Joseph Lead Co., New York.

—o—

Herman L. Moelke, vice president in charge of finance, and a director of Ford Motor Co., Detroit has retired.

—o—

Robert F. Coggeshall, in charge of personnel and student training for International General Electric Co., Schenectady, N. Y., has retired after 45 years with G. E. and its affiliates.

—o—

Dr. Gwoh-Liang Lee has been appointed representative in China for the H. K. Ferguson Co., Cleveland. During the war he was associated with the company in the design of industrial facilities for the Ordnance Department and Chemical Warfare Service. **W. N. Thompson,** vice president of the Ferguson Co., is in charge of the firm's Export Division, which is now operating in South America, India, Canada and China.

—o—

James C. Windham has been elected treasurer and assistant secretary, F. L. Jacobs Co., Detroit. He formerly was assistant to the director of the Reconstruction Finance Corp.

—o—

Harley H. Noyes has been elected vice president in charge of advertising of Oneida Ltd., Oneida, N. Y. He has been a board member for 25 years and a member of the executive committee for 10 years.

—o—

Austin Drewry, Gunnison Homes Inc., New Albany, Ind., subsidiary of U. S. Steel, has been elected president of Prefabricated Home Manufacturers' Institute, Washington. Other officers elected are: **John Pease,** Pease Woodwork Co., Cincinnati, vice president, and **Hart Anderson,** Page & Hill Co, Minneapolis, secretary-treasurer. **John C. Taylor Jr.,** American Houses Inc., New York, and Mr. Drewry have been elected members of the board of directors, to serve a period of three years.

—o—

Dr. George R. Harrison, dean of the School of Science, Massachusetts Institute of Technology, has been elected chairman of the American Institute of Physics, succeeding **Dr. Paul E. Klopsteg,** director of research, Northwestern University Technological Institute, who has served as chairman since 1940.

—o—

Herbert A. Snowden has been named general superintendent of the rod and wire department, Portsmouth Steel Corp., Portsmouth, O. He was formerly associated with Seneca Wire & Mfg. Co., Fostoria, O., and prior to that was, for many years, assistant to the general superintendent of J. A. Roebling's Sons Co., Trenton, N. J. Other appointments include **Uno V. Johnson** as superintendent, **John E. Nordstrom** as chief metallurgist and **James F. Van Cleave** as superintendent of production. Before assuming his present position, Mr. Johnson had been superintendent of the wire mill of Wickwire-Spencer Steel Co., Buffalo. Mr. Nordstrom had been assistant chief metallurgist and Mr. Van Cleave assistant superintendent of production for Keystone Steel & Wire Co., Peoria, Ill.

—o—

A. Frye Ayers has been appointed central district industrial manager for Westinghouse Electric Corp., Pittsburgh. He succeeds **J. E. Payne,** who has been named manager of headquarters industrial sales.

—o—

George C. Floyd has been appointed manager of operations, Thomas Steel Co., Warren, O. He succeeds **Herman A. Mentall,** vice president in charge of operations, who has retired after being associated with the company for 20 years.

—o—

Burdette M. Baldwin has been appointed sales promotion manager, Air-Way Electric Appliance Corp., Toledo, O. He rejoins this corporation, having been connected with it for 13 years before the war. He was recently manager of the industrial department of the Toledo Chamber of Commerce.

—o—

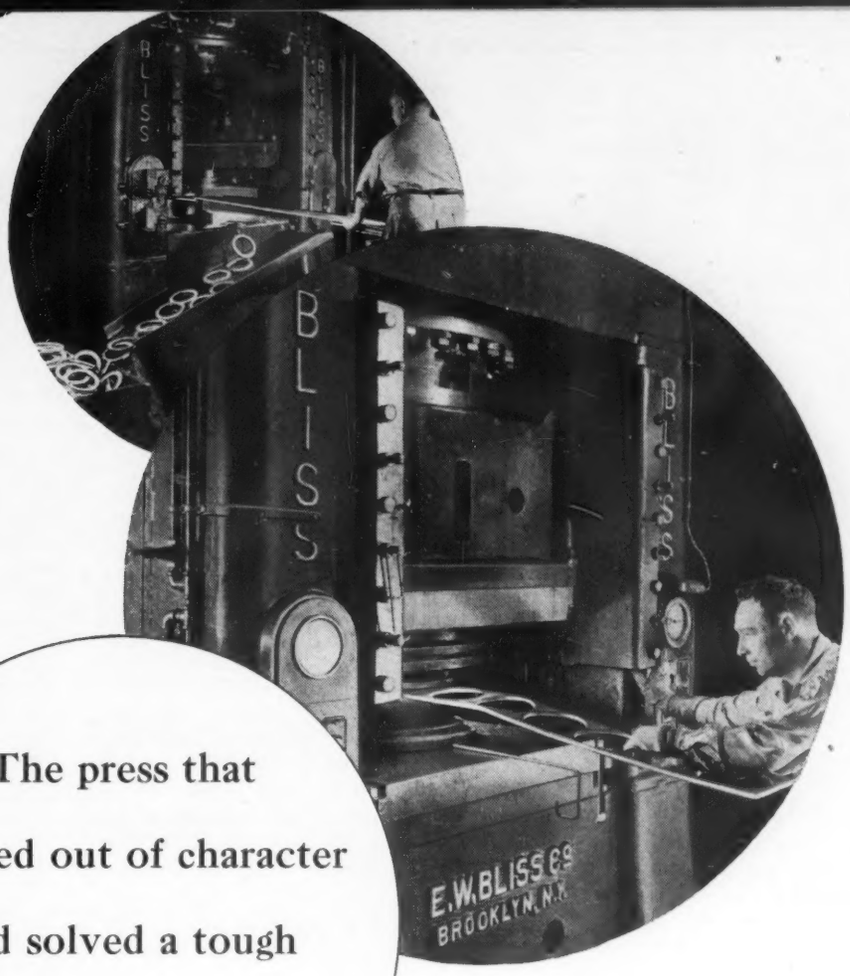
A. J. Fischer has been appointed manager of the Carbide & Cast Alloy Division, Jessop Steel Co., Washington, Pa. He was previously associated with the Firth-Sterling Steel Co., as assistant to the supervisor of carbide production. Mr. Fischer joined the Jessop Steel Co. recently.

—o—

C. Grindrod has become associated

DR. GEORGE R. HARRISON

A. J. FISCHER



The press that stepped out of character and solved a tough production problem

Putting a press through paces other than its intended applications calls for the right combination of operator ingenuity plus press flexibility.

Goetze Gasket and Packing Company is supplying the operating "know-how" and this Bliss 750-ton Hydro-Dynamic Press is doing the rest. That's why you see this hydraulic press stepping out of character to blank cold 4,000 half-inch thick steel alloy rings daily where previous methods and equipment for blanking the rings hot involved a slower manufacturing cycle and very limited output.

"Naturally the press paid for itself in no time," we're told by Goetze's Plant Engineer. "Over and above its regular hydraulic pressing applications, it's the busiest press in the shop because it's so adaptable for both long and short runs. During eight years of constant use, we've had very little maintenance to worry about. Considering that we feed as much as 50,000 pounds of heavy steel stock in a single day to produce these 10" diameter rings—it speaks well for the press' design and solid construction."

Such extra-utility is an added dividend that ninety years of press manufacturing builds into Bliss equipment of every type and size.

Bliss engineers are trained to survey your press needs, evaluate the applications you have in mind and recommend the right type of press—mechanical or hydraulic—solely on its engineering merits. Isn't this the kind of unbiased counsel you'd like brought to your problem?

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Brooklyn, N. Y.; Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France. • SALES OFFICES: Detroit; Brooklyn; Cleveland, Dayton, Toledo, Ohio; Lansing, Mich.; Chicago; Philadelphia; Rochester; New Haven; Boston; Toronto.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

STAY AHEAD WITH *Bliss*

with the Dole Valve Co., Chicago, and will serve as plant manager. For the past several years he has been connected with Bowser Inc., Ft. Wayne, Ind., as assistant vice president in charge of production, and with Joseph Weidenhoff Inc.

—o—

Warnick J. Kernan has been elected a director of Savage Arms Corp., New York, increasing the number of directors from nine to ten.

—o—

Elmer A. Stevens has been appointed director of purchases, B. F. Goodrich Co., Akron. He succeeds **A. D. Moss,** who has been associated with the firm for 48 years, and who has retired. Mr. Stevens had been previously assistant director of purchases.

—o—

Arthur E. Kallinich and **David J. Post** have been elected vice presidents, Veeder-Root Inc., Hartford, Conn. **Andrew J. Rebmann** has been elected assistant treasurer of the company.

—o—

Daniel R. Moser has been appointed Minneapolis sales representative for the Columbia Chemical Division, Barberton, O., Pittsburgh Glass Co., Pittsburgh.

—o—

John B. Bell, Rollway Bearing Co. Inc., Syracuse, N. Y., has been named to head the company's new sales office in Pittsburgh. He was formerly sales representative in the Syracuse office. Address of the Pittsburgh office is Room 507, Renshaw Bldg., 9th St. at Liberty.

—o—

James D. Stearns has been appointed controller of Tucker Corp., Chicago. He had previously been connected with the Cadillac Division of General Motors Corp., Detroit.

—o—

Jack A. White has joined Remington Corp., Cortland, N. Y. He will establish a new export service department. He had previously been associated with Carrier Corp., Syracuse, N. Y.

—o—

Allis-Chalmers Mfg. Co., Milwaukee, has adopted a new regional set-up for the field organization in the company's General Machinery Division, in which the branch offices in the new regions become district offices. In the first four regions established, the following have been appointed district managers: New England region, **A. B. Frost** and **R. H. Porterfield,** managers of the New Haven and Providence district offices, report to **W. F. Taylor,** Boston, manager of the region; Southwest region, **W. R. Horrigan, Aubrey Phillips, E. R. Hury, L. G. Park** and **R. I. Moore,** managers of the Amarillo, Houston, San Antonio, Shreveport and Tulsa district offices, report to **J. L. Pratt,** region manager, who has been succeeded as manager of the Dallas district office by **H. L. Reynolds;** Southeast region, **J. J. Greagan, William Parker, J. W. Roberts, G. H. Hoffman, A. R. Knauss, Joseph Bronaugh, R. F. Muller** and **A. D. Robertson,** managers of Birmingham, Charlotte, Chattanooga, Knoxville, Memphis, Miami, New Orleans and Tampa district offices, report to **D. S. Kerr,** manager of the region, who is succeeded as manager of the Atlanta district office by **Charles F. O'Riordan;** Pacific region, **F. V. Sams, F. H. Searight, U. E. Sandelin,** managers of Portland, San Francisco and Seattle district offices, report to **A. J. Schmitz,** manager of the region. In this region, **C. W. Schweers,** formerly manager of the Houston district office, has been appointed manager of the Los Angeles district office, succeeding **A. D. Brown,** named manager of the company's Washington office. **R. N. Landreth,** acting manager of the Washington office, will now devote full time as assistant to **W. C. Johnson,** vice president of the General Machinery Division. **A. R. Kohlmetz** remains as manager of the Spokane branch of the Seattle district.

—o—

Edward C. Hyland, Pittsburgh Plate Glass Co., Pittsburgh, has retired after serving 48 years with the company. He was director of commercial research, industrial finishes, in the Industrial Paint Division.

—o—

Vice Adm. William A. Glassford, U. S. N. (retired), has been appointed European manager for activities in the United Kingdom and the continent of Europe by Radio Corp. of America, New York. His headquarters will be in London, Eng.

—o—

F. E. Kling, H. A. Brassert & Co., consulting engineers, New York, has been named chief engineer. He will be in charge of the Chilean iron and steel project for the Corporacion de Fomento de la Produccion.

—o—

Lloyd B. Smith has been appointed sales representative of Samuel Moore & Co., Cleveland. He will cover the territory of Alaska and Washington, Montana, Oregon and Idaho. His headquarters will be in Seattle.

—o—

Dr. C. E. MacQuigg, dean of engineering, Ohio State University, has been appointed a member of the consulting staff of the Taylor-Wharton Iron & Steel Co., Easton, Pa.

—o—

Alfred L. Hartung has been appointed assistant sales manager, Cans Inc., Chicago. He was associated previously with the American Can Co., Detroit.

—o—

C. A. Blake, Oldsmobile Division, General Motors Corp., has been named Chi-

H. M. HAMMOND

Promoted to vice president, Bailey Meter Co., Cleveland. Noted in STEEL, Apr. 7 issue, p. 84

P. S. DICKEY

Named vice president, Bailey Meter Co., Cleveland. Noted in STEEL, Apr. 7 issue, p. 84

DR. MELVILLE F. PETERS

Appointed chief engineer, Titeflex Inc., Newark, N. J. Noted in STEEL, Mar. 31 issue, p. 74

WALTER H. WIEWEL

Recently elected president, Trent Tube Mfg. Co., East Troy, Wis. Noted in STEEL, Apr. 7 issue, p. 86

WALDEMAR NAUJOKS

Recently elected to the presidency of the Bison Forge Co. Inc., Buffalo. Noted in STEEL, Apr. 7 issue, p. 84

W. J. EBERLEIN

Elected vice president, sales, Greenfield Tap & Die Corp., Greenfield, Mass. Noted in STEEL, Apr. 7 issue, p. 84

cago zone manager to succeed the late **L. J. Blunden.** Mr. Blake has been associated with the sales department of General Motors since 1929, and has been with Oldsmobile exclusively since 1934, when he became service manager in Pittsburgh. He has since held sales and service positions with this division in Lansing, Los Angeles and St. Louis, and was recently zone manager in Kansas City. **F. J. Spexarth** has been named to succeed Mr. Blake in Kansas City, and S. M. Johnson has been named assistant zone manager.

—o—

Edwin E. Potter has been elected a vice president, General Electric Co., Schenectady, N. Y. He will be in charge of customer relations and will succeed **Earl O. Shreve,** who continues with the company as a member of the president's staff, with special duties as assigned. In his new position, Mr. Potter will direct the activities of the company's commercial vice presidents in the field.

—o—

Guy Berghoff, director of public relations, Pittsburgh Glass Co., Pittsburgh, has been named director of the company's advertising activities.

OBITUARIES . . .

Henry Ford, 83, noted automobile industry pioneer and world famed industrialist, died at his home in Dearborn, Mich., Apr. 7. He had not been active in the management of the Ford Motor Co. enterprises since 1945 when he resigned as president, being succeeded by his grandson, Henry Ford II (See Mirrors of Motordom, p. 73).

—o—

Harry C. Beaver, 70, vice chairman of the board and former president of Worthington Pump & Machinery Corp., Harrison, N. J., died recently of a heart attack.

—o—

Edwin B. Peet, 64, sales engineer, Cameron Can Machinery Co., Chicago, died Apr. 4. For many years he had been sales engineer with E. W. Bliss Co., Brooklyn, N. Y.

—o—

Perley W. Sawyer, 73, retired manager, St. Louis Division, Minnesota Mining & Mfg. Co., St. Paul, died Apr. 4 in Evanston, Ill. He had been president, Wausau Abrasives Co., Wausau, Wis., now a part of Minnesota Mining & Mfg. Co.

—o—

Charles P. McConnell, 65, retired chairman, Central Scientific Co., Chicago, died Apr. 7 in Evanston, Ill. Associated with the company for 30 years, he had been president from 1937 to 1941.

—o—

E. L. Berry, 52, vice president in charge of production, Link-Belt Co., Chicago, died Apr. 3. He had been, also, vice president and director of Link-Belt Speeder Corp.

—o—

Anton Brust, 64, founder and president, Brust Tool & Mfg. Co., Chicago, died Apr. 2 in that city.

—o—

Raymond B. Zerfey, chief engineer, Tool Steel Gear & Pinion Co., Cincinnati, died Mar. 31. He had served as committeeman and as chairman of several committees of the American Gear Manufacturers Association.

—o—

Henry F. E. Gamm, 75, head of the Briqueting Machinery Co., Rutherford, N. J., died Apr. 3.

—o—

Herbert C. George, 51, plant superintendent at Terre Haute, Ind., Stran-Steel Division, Great Lakes Steel Corp., Detroit, died recently of a heart attack.

—o—

William A. Williams Jr., 53, Safeway Steel Scaffolds Supply Corp., Long Island City, N. Y., died Apr. 3.

—o—

Percy E. Glenn, 59, Harrison Radiator Division, General Motors Corp., Lockport, N. Y., died recently. He had been associated with the division for 30 years.

—o—

Philip G. Franklin, 53, owner and president of the Young & Franklin Tool Works, Liverpool, N. Y., died Apr. 1.

—o—

E. C. Oliver, president, Oliver Instrument Co., Adrian, Mich., died recently.

—o—

Armen H. Tashjian, engineer who designed many of Cleveland's public buildings, and consulting engineer for the Union Metal Mfg. Co., Canton, O., died recently.

—o—

Alfred A. Handler, 63, chief forging engineer, Aluminum Co. of America, Pittsburgh, died recently in Miami Beach, Fla.

—o—

George D. Barron, 88, mining engineer, died Apr. 1 at his home in Rye, N. Y. He had been a director of the Engineering Foundation and the American Institute of Mining & Metallurgical Engineers Inc.

—o—

Alfred W. Dodd, 82, former sales manager, vice president and director of the American Zinc, Lead & Smelting Co., New York, died recently.

—o—

Harry S. White, 70, owner and operator of the White Pattern Works, Buffalo, died recently.

Vacuum Melting and

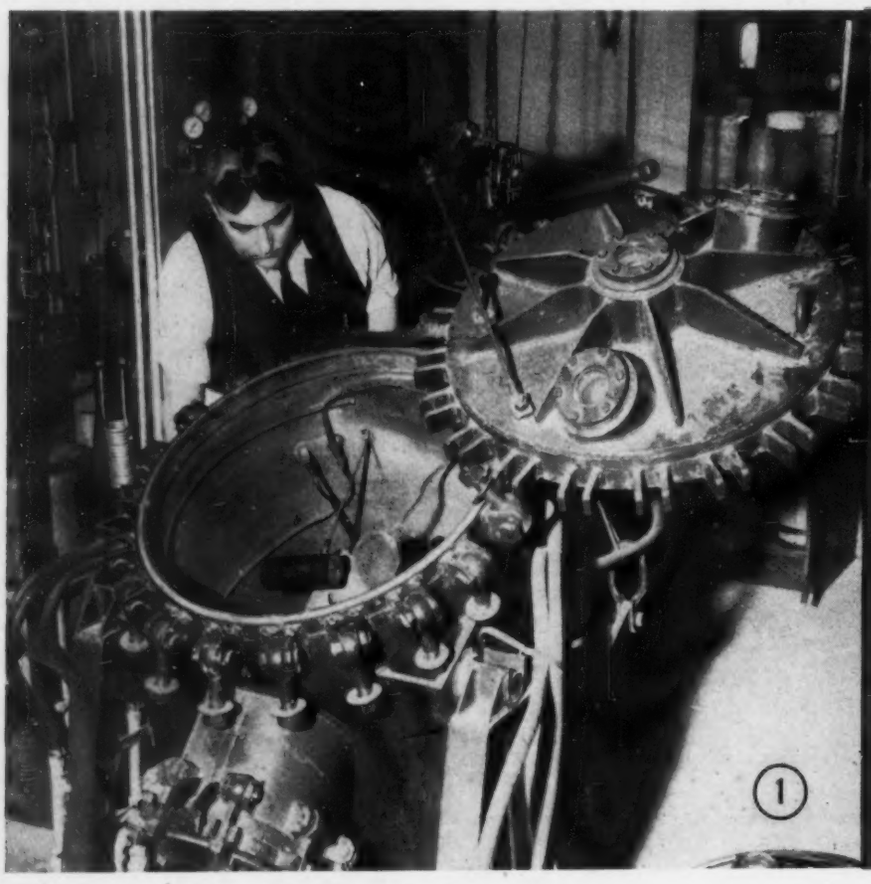
Alloys produced by vacuum methods possess properties which cannot be duplicated by any other means. Among other things they are particularly suited for high temperature service. General principles, status and future posibilities of this technique as practiced here and abroad are discussed

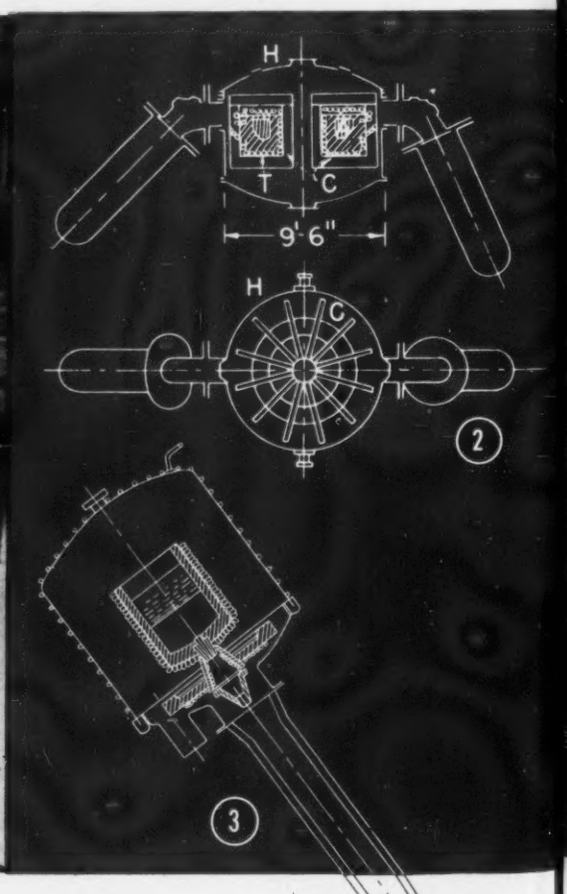
MELTING and casting of metals and alloys in a manner to produce the soundest and purest ingots possible is a problem which is being viewed with increasing interest throughout the metallurgical industry.

Vacuum melting and casting offers a method for the production of a pure, dense product substantially free from oxides, occluded gases and dissolved nitrogen and hydrogen. While the process of melting and casting in a vacuum in this country is so far primarily a laboratory procedure for use in special research work, when the true effect of "gases in metals" is more thoroughly understood it is not at all impossible that commercial use of such processes in tonnage production may be found advisable.

Production of nickel-chromium alloys by vacuum melting was carried out to advantage in batches up to 10,000 lb in Germany during the year 1938. Even the present state of application and development of vacuum metallurgy has shown that alloys made by this process have certain properties which cannot be duplicated by any other means. In the meantime it is desirable that metallurgical laboratories continue the study of vacuum melting and pouring, not only in making alloys that can be so handled, but also on those for which the value of such refinements is not established.

General Applications: Vacuum furnaces have many general metallurgical applications. A list of some of these most important applications follows[1]: (1) Drawing off occluded gases in vacuum tubes during sealing; (2) determination of gases in metals; (3) purifying graphite; (4) heat treatment of certain critical metals; (5) making gas free metals and alloys; (6) reducing melting losses of certain metals; (7) vaporization coating of surfaces; (8) fractional distillation of metals; (9) precision casting; (10) certain soldering or joining work; (11) melting of critical alloys not readily melted in the open.





By ALLEN G. GRAY
Consulting Editor, STEEL

d Casting

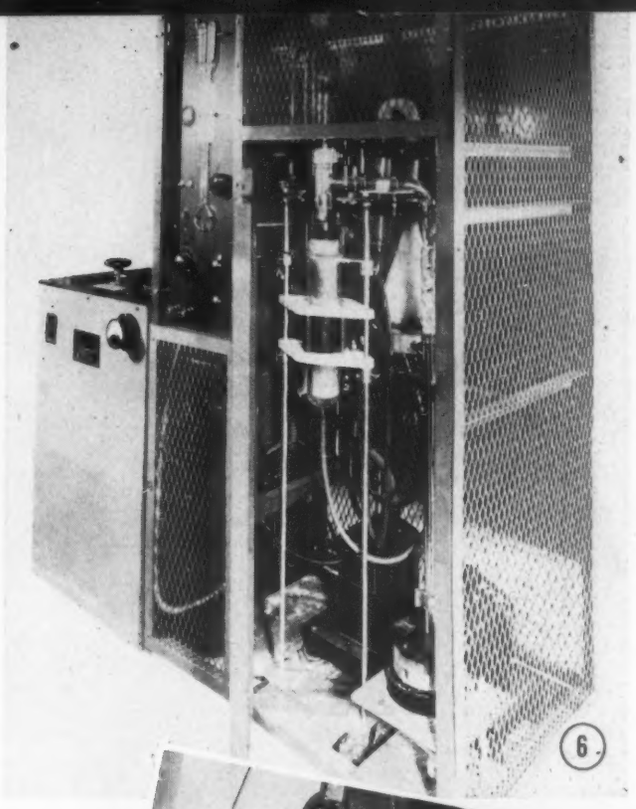


Fig. 1—Inside view of the furnace shown in Fig. 5. Courtesy Ajax Electrothermic Corp.

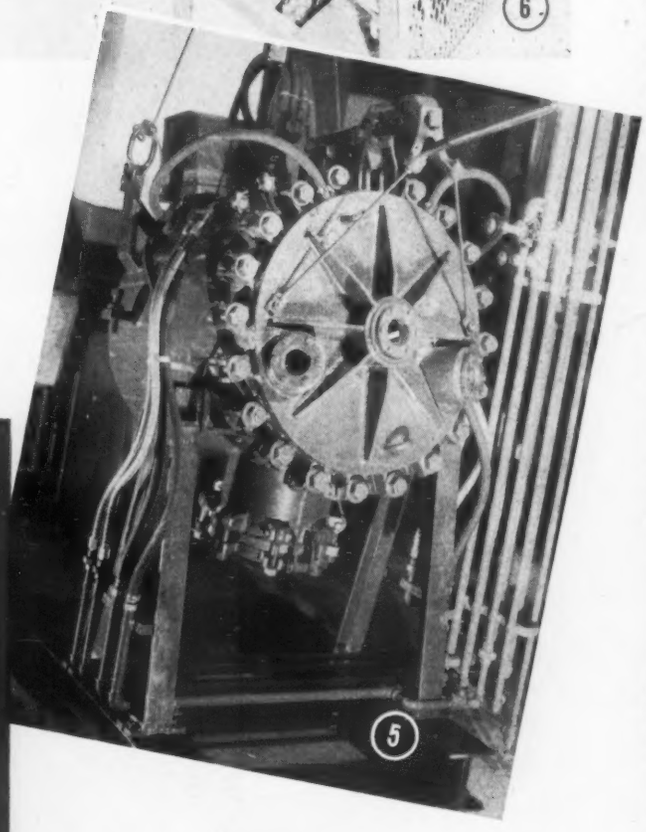
Fig. 2—Side and top views, respectively, of the ring type, low frequency vacuum melting furnace. A is the ring shaped crucible; T indicates primary windings; C, yokes; H shows edges where the furnace is sealed and where evacuation pipes are located

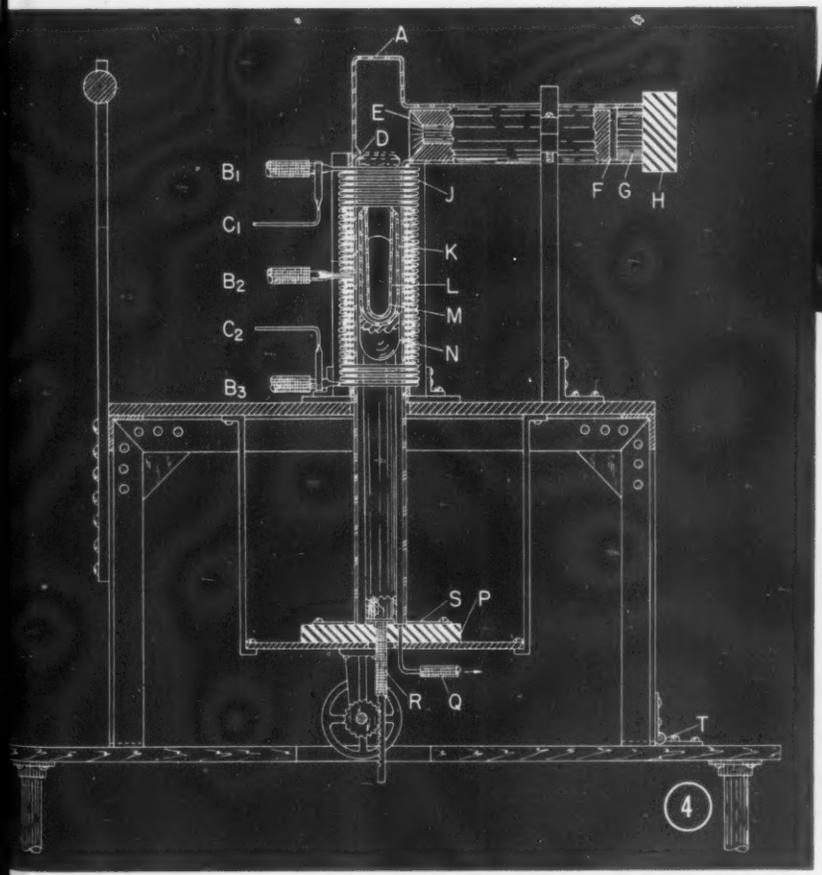
Fig. 3—Fundamental design of the vertical 4-ton high frequency vacuum melting and pouring furnace develcned by Dr. Rohn. Courtesy Zeitschrift für Metallkunde

Fig. 4—Early laboratory type vacuum furnace developed by Reeve of Bell Telephone Laboratories

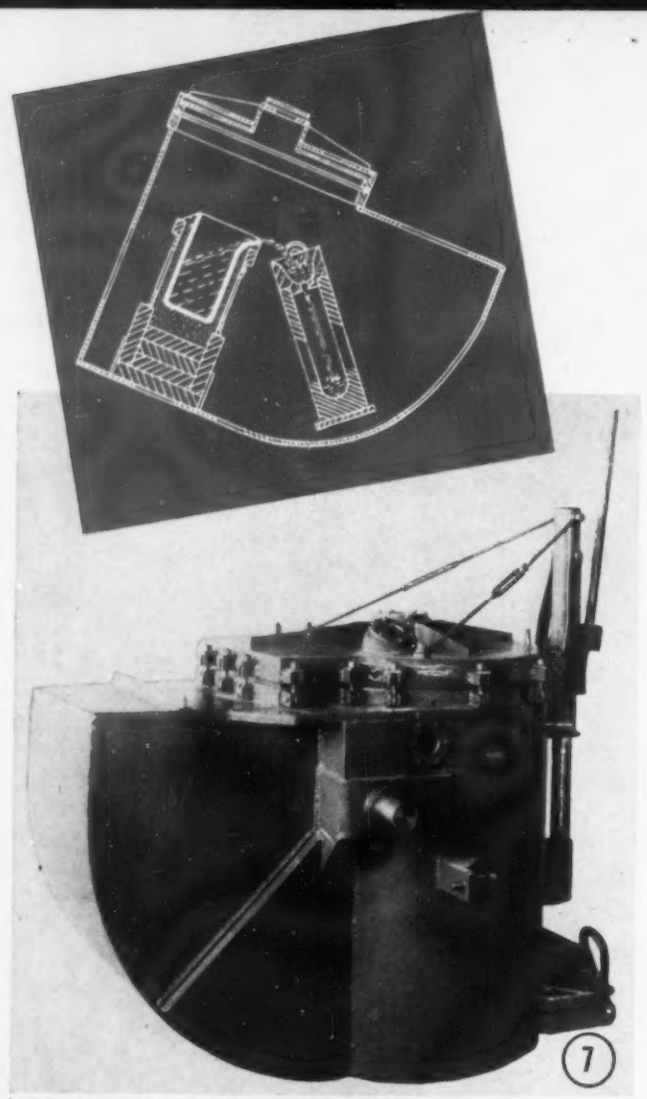
Fig. 5—Vacuum melting furnace powered by motor generator units capable of melting and casting 50 lb of steel under vacuum. This type furnace is in use at Bell Telephone Laboratories and elsewhere for semiproduction work. Courtesy Ajax Electrothermic Corp.

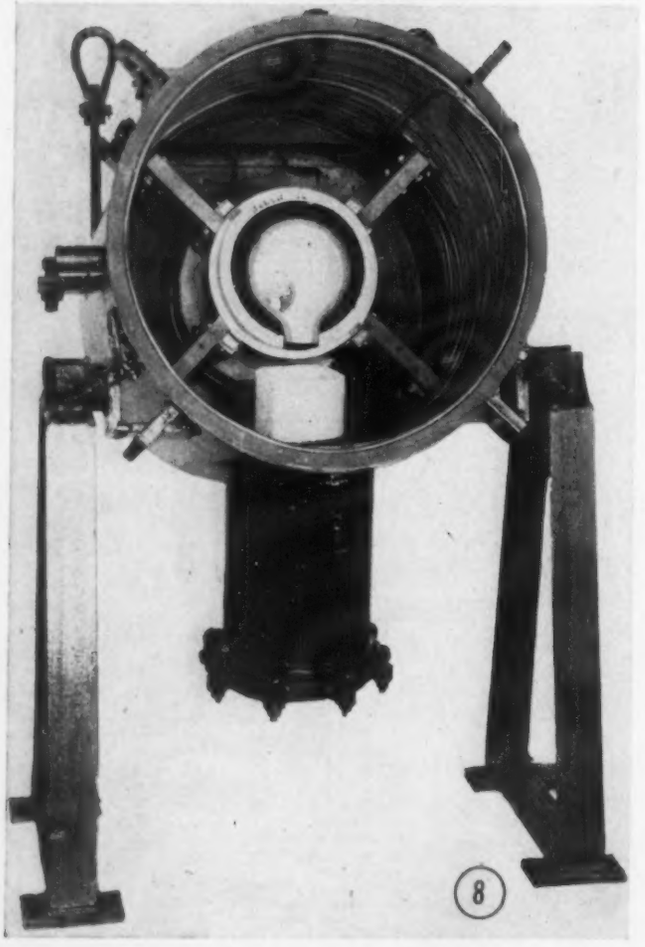
Fig. 6—The Cenco-Dirge apparatus for determination of oxygen content of steel. Manufactured by Central Scientific Co.





A—Quartz tube with transparent top
B1, B3—Water outlets
B2—Water Inlet
C1, C2—High frequency current leads
C—Crucible stop
E—Mold
F—Asbestos board
G—Refractory tube for spacer
H—Rubber stopper
J—High frequency coil
K—Outer crucible
L—Refractory insulation
M—Inner crucible
N—Support for crucible
P—Rubber base
Q—Connection to vacuum pump
R—Metal rod through stopper
S—Metal ring for holding down stopper
T—Hinge for tilting apparatus





STATUS OF GERMAN VACUUM FURNACE CAPACITIES
(Furnaces built by Haraeus Vacuumschmelze)

Year	Capacity of Largest Furnace	Type of Furnace
1917	1.1 lb	Crucible furnace; resistance heat
1919	6.6 lb	
1920	11.0 lb	
1922	52.9 lb	
1923	88.2 lb	
1924	661.5 lb	Induction furnace, low frequency
1925	661.5 lb	
1926	1,102.5 lb	
1928	8,820.0 lb	
1931	44.1 lb	High frequency induction furnace
1934	1,102.5 lb	
1936	4,410.0 lb	
1938	11,025.0 lb	

Some of the earliest vacuum furnaces were those made to bake out vacuum tube parts. At an early date vacuum furnaces were used by the Bureau of Standards and others in their gas analysis and precision melting temperature work. Vacuum furnaces were later built for production work, involving large batch melts at the plant of Heraeus Vacuumschmelze (Dr. Rohn) in Germany. By melting in vacuum at pressures below one atmosphere or in low pressure artificial atmospheres, such as natural gas or hydrogen, carbon free chromium alloys were obtained. Heraeus Vacuumschmelz is reported to have made and rolled steels for high temperature service, stainless steels, beryllium alloys and master alloys. Most of the alloys produced were melted and poured at an inside pressure of approximately 7 mm of mercury and the vacuum was released ½ hour after pouring. Melting in vacuum prevents loss of beryllium, secures hardenable alloys with reproducible properties, and eliminates gases as well as carbon, sulphur, and phosphorus.

According to a report in Zeitschrift fur Metallkunde[2] of all the types of vacuum furnaces developed by Rohn in Germany, two were most commonly used: First, the ring type which was an inductively heated vacuum furnace with one or two attached molds at a well defined angle so that the charge was not only melted but also was poured under vacuum and entered the mold directly. The design principles of such a furnace is shown in Fig. 2. The second general type of furnace, shown in Fig. 3, involved the vertical crucible vacuum melting and pouring technique in which the crucible in which the metal was provided at the bottom with a discharge opening or tap hole plugged with metal. When the metal charge was ready to be cast, the tap hole plug was melted by an induction coil. The metal charge was then cast into a water cooled copper mold. Low and high frequency currents were used depending on the type of furnace. The status of vacuum furnace development is given in the accompanying table showing furnace capacities available in the respective years (all were (*Please turn to Page* 132)

Fig. 7—High frequency vacuum furnace of the latest Ajax-Northrup type. These are made with capacities up to 200 lb and more, and are so constructed that the fully encased mold pivots and remains vertical during pouring as shown in the inset

Fig. 8—Pouring a charge under vacuum conditions has been accomplished by tilting the chamber containing the crucible and mold so that the metal will pour from one into the other

Streamlining INDUSTRIAL METHODS

. . . for increased production and lower manufacturing costs

By G. A. VISSER
Manufacturing Engineers
Tulsa, Okla.

SOUND top management planning is of greater importance today than it has been at any time in the history of the country. In order to streamline industrial methods, it is necessary constantly to accumulate facts and to transform these facts into clearly-defined managerial controls for eliminating wasted time and for increasing productivity.

Between 1899 and 1929, the volume of goods manufactured increased 216 per cent. Industrial employment increased 88 per cent, wages doubled and workers reduced their work week an average of 20 hours. Increased productivity reduced the price of sheet steel from $123.00 to $56.00 per ton, between 1923 and 1944. During the same period, the price of gasoline was reduced from 25 cents to 15 cents per gallon, excluding tax, and we purchased aluminum for 15 cents per pound which formerly cost 33 cents.

In the past, we approached the development of machine tools and products with the utmost accuracy. We went to great expense to create new and better methods, using the best scientific talent and facilities. The same cannot be said of the development of managerial controls. The changes which have taken place over the last few years make it necessary to replace old precedents and habits by objective planning and well formulated factual procedures.

The development of formulas integrating wages with productivity is a complicated task, particularly since the attitude of employees is growing toward group recognition. The shortage of manpower during the war created many inequalities; rates of pay had to be set without the benefit of a yardstick with which to work. Often wages were by a vague, unscientific, arbitrary and erroneous basis of calculation, resulting in unbalanced wage structures.

War controls prevented corrective measures; today, management and labor are facing the common problem of eliminating inequities and providing incentives for workers to produce and for management to invest in tools, equipment and improved manufacturing facilities.

There is evidence that labor leaders are beginning to realize that trade unions can survive only through increased production. A recent labor contract between the Eclipse Pioneer Division of Bendix Aviation and the aircraft workers union contains a clause that, in return for a 12 cent increase, the union guarantees to increase production not less than 15 per cent. Other recent union contracts have productivity clauses incorporated, some of which are based on incentive earnings, others on piecework performance or on over-all profit sharing plans.

Rates set according to a title or job classification become less and less acceptable. The last few years there have been many arbitration cases on the subject. A United States court ruled on the question of titles as follows: "Depends not on what their employment is called but upon what one in that employment is called upon to do, and again it may depend on the extent to which he is called to perform certain work." Therefore, title of "engine lathe operator", "clerk", or "engineer" is not sufficient, without a detailed description.

Today, many employers have evaluated their jobs and eliminated inequities, since inequities within one organization are more harmful to productivity than a wage differential between one organization and another. Many productive hours are lost because of inequities. Workers in one classification feel that they should receive more than workers in another classificaton. It is for this reason that labor today is often more interested in an over-all payroll increase than in a general rate increase per employee.

Sound labor relation policies integrate prerogatives, regulations and the application of a job evaluation system into well formulated impersonalized procedures, which eliminate discrimination or favoritism.

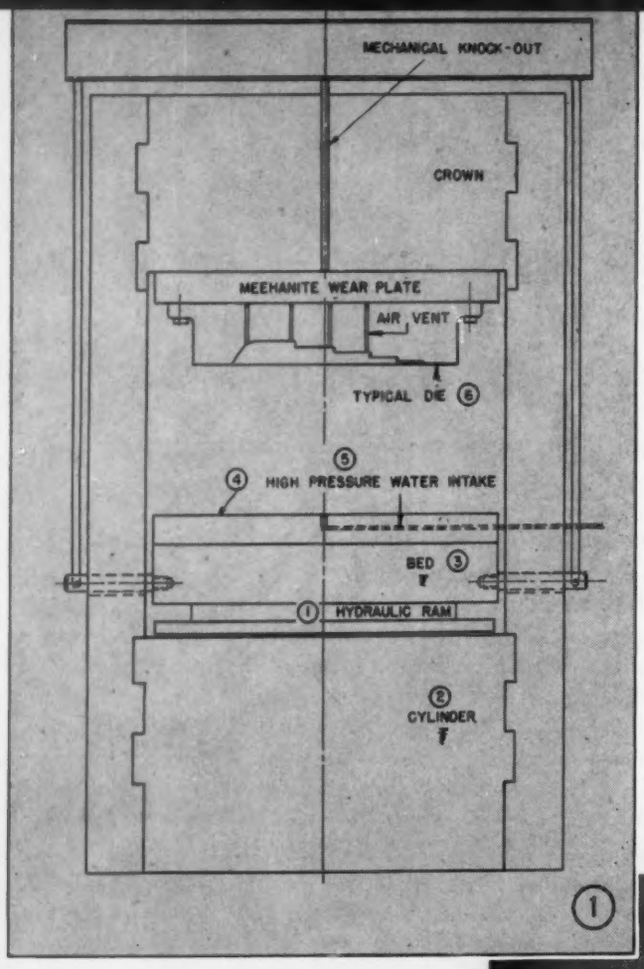
To measure the amount of productivity received for wages paid, the function of cost control becomes a more vital part of works management. Cost departments, in many organizations, are considered as bureaus

(*Please turn to Page* 126)

Voice of the Past

"The enormous field for manufacturing industry in all its complex and endless variety, with our raw materials, our home consumption and foreign demand, foreshadows a traffic whose magnitude and whose profit cannot now be estimated.

"These are the great elements of material progress; and they comprehend the entire circle of human enterprise — agriculture, commerce, manufacturing and mining. They give us into our hands, under the blessing of Almighty God, the power to command our fate as a nation. They hold out to us the grandest future reserved for any people. With such amplitude and affluence of resources, and with such a vast stake at issue, we should be unworthy of our lineage and our inheritance if we, for one moment, distrusted our ability to maintain ourselves a united people, with 'one country, one constitution, and one destiny'."—James G. Blaine on April 21, 1864, before the House of Representatives.



"FLUID

Draws Sheet Metal

DRAWING and embossing sheet metal into shallow sweeps and shapes as well as drawing cone-shaped and tapered stampings can now be done in a single operation with a process which employs water under very high pressure instead of a mechanical punch to form the metal into the desired shape. Only one die section is used, the water "bulges" the metal to the recessed contours of the female die.

This method of drawing and embossing sheet metal, called the Hydrodynamic process, is a development of S. B. Whistler & Sons Inc., Buffalo. Fig. 1 presents the equipment used for this method of working sheet metal. The sample hydraulic press shown has the ram (1) and

Fig. 1—General setup of Hydrodynamic process for use on a typical press

Fig. 2—Die, water container, etc., used in producing the part shown

Fig. 3—Parts which were embossed or drawn from various sheet metals: (A) Material used was 0.078-in. enameling iron and 0.040-in. 18-8 type stainless steel; the 0.032-in. thick 25-20 stainless was drawn 4-1/32-in. deep in the part shown in (B); tapered part shown in (C) was drawn from 0.094-in. thick 24 SO aluminum alloy; (D) was made from both 0.025-in. thick 25-20 stainless and 0.025-in. Inconel; same die was used for both 0.50-in. enameling iron and 0.031-in. stainless of the 18-8 type for the stamping of the wing shown in (E)

Fig. 4—This stamping of 18-8 stainless steel was made in one operation

Fig. 5—Detail of water container and pressure pad holder as well as its location with respect to the female die

PUNCH"

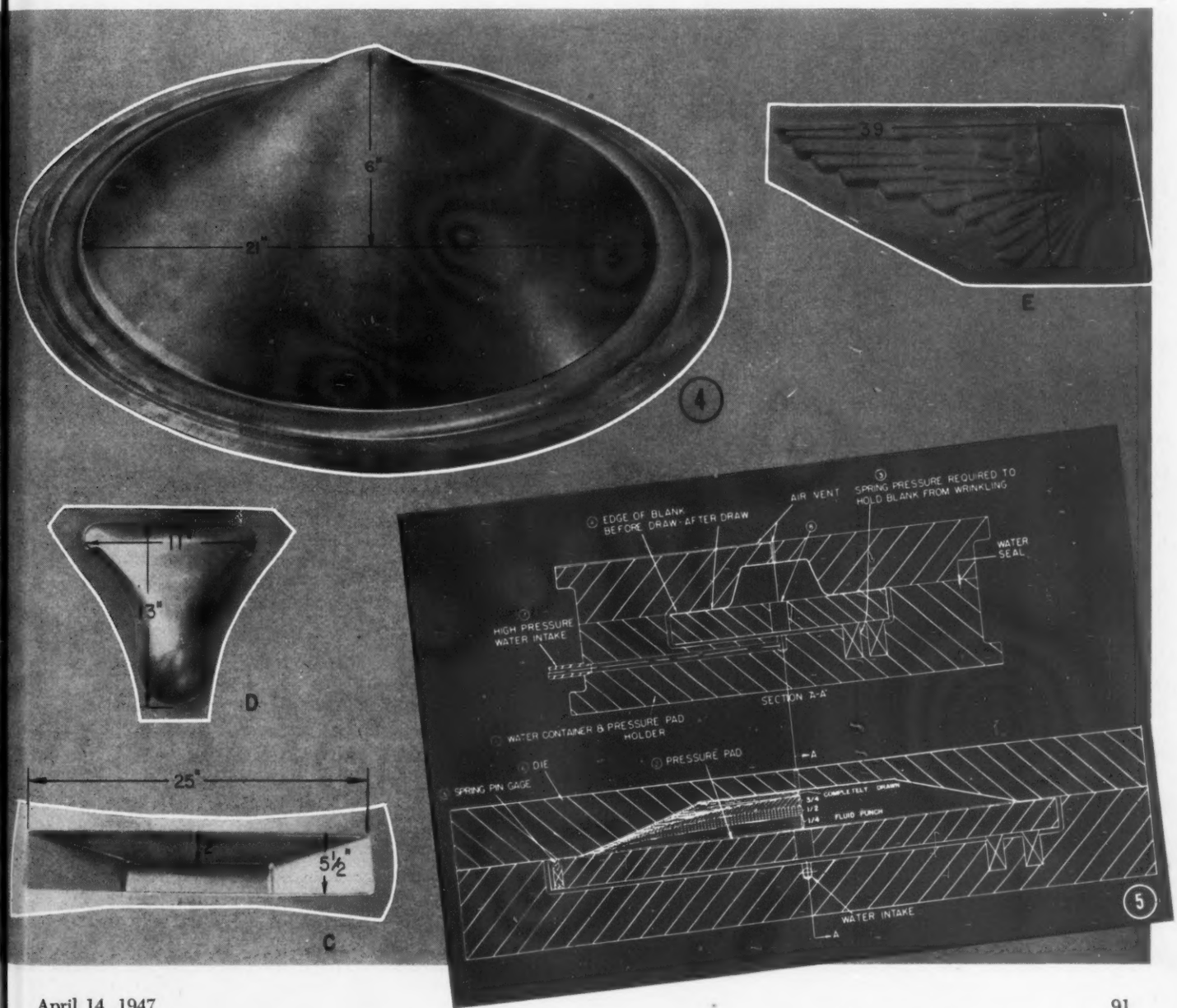
Use of one die section and water under high pressure in place of mechanical punch characterizes process which permits the drawing of many difficult shapes in single operation

in One Operation

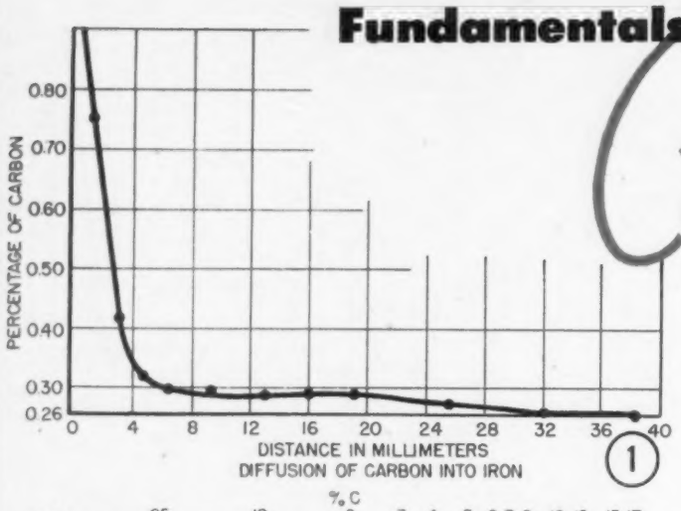
cylinder (2) in the lower portion of the press. Upon the cylinder rests a bed (3) and upon this bed, is mounted an auxiliary bed (4) which has an opening (5) which connects to a hydraulic pump. Upon this auxiliary bed is placed the material to be embossed. The die is closed tightly on the metal, under sufficient pressure to prevent the material surrounding the embossment from movement while the embossing is taking place.

In Fig. 5, part (1) is a fluid container. It may be round, square, or rectangular depending upon which shape is best suited to the stampings to be made. Pressure pad (2) is located in a recess in the fluid container. It rests on a group of springs (3) of proper pressure to hold the material being worked from forming wrinkles while being drawn to shape. A blank is laid on the face of the pad, nested by spring pin gages (5) and the press is closed, bringing the surface of the die (6) in contact with (1). Metal to metal seal formed is held by hydraulic pressure.

Water under high pressure is then injected through the orifice in the fluid container (7) and passes through the opening in the pressure pad (8), Fig. 5. This "fluid punch" applies its pressure to the greater diameter or areas first and then to the smaller diameter or areas thus forming the metal to the outline of the female die. Shown in Fig. 2 is a typical die, water container, etc., used in producing in one operation the (*Please turn to Page* 118)



Fundamentals of Carburization and



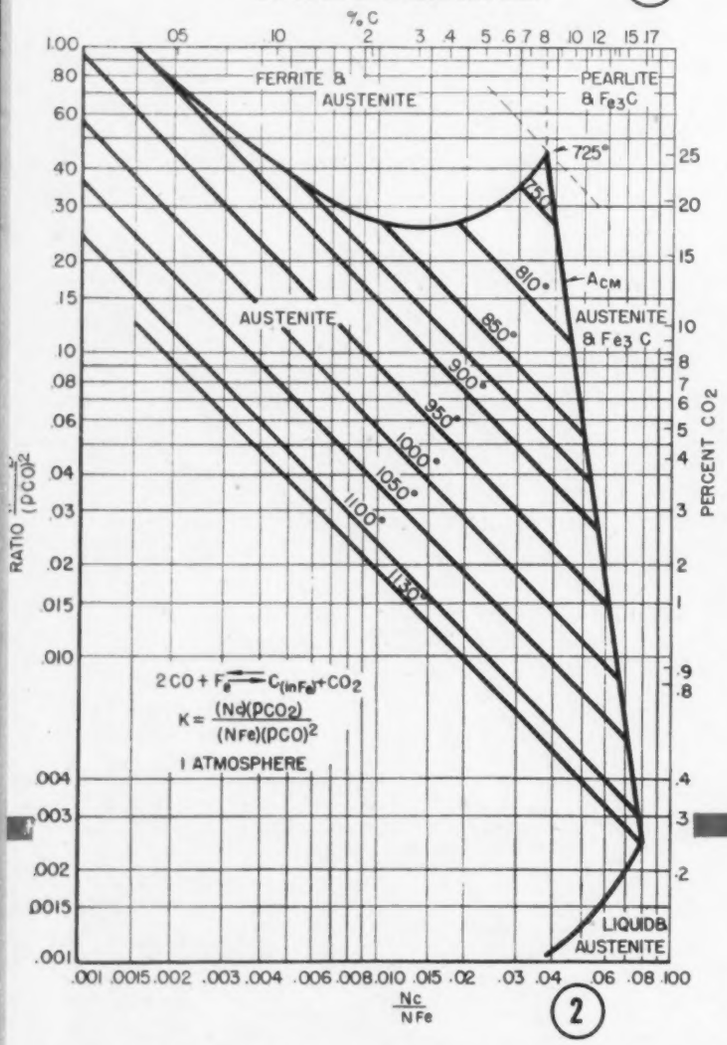


Fig. 1—The Roberts-Austen carbon penetration curve

Fig. 2—The equilibrium between carbon monoxide and austenite

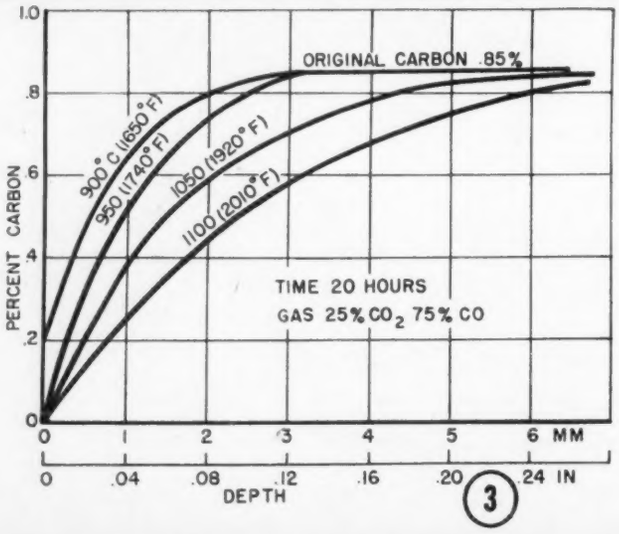
Fig. 3—Effect of temperature on decarburization by carbon dioxide-carbon monoxide. (After Bramley and Lord)

Fig 4—Schematic representation of heat treatments possible after carburization

Fig. 5—Methane-carbon, hydrogen equilibrium. With increasing temperature the methane decomposition is increased

CARBURIZATION is defined as the addition of carbon to solid metals. On the other hand, decarburization—the opposite of carburization—is defined as the removal or elimination of carbon from carbon-containing metals. Since carburization and decarburization are generally restricted to iron and steel, this article will not discuss other metals although the principles underlying the subject will be similar in all cases. Any metal which has some solid solubility for carbon can be carburized, and on the other hand any carbon-containing metal can be decarburized.

If one considers an infinitely thin sheet of pure iron in contact with a carburizing medium, equilibrium between the two can be established and the equilibrium can be considered to take place instantly. In this way the iron is carburized and is thereby converted into steel. (The simplest variety of steel is defined as a ductile alloy of iron and carbon; cast iron would be considered a brittle alloy of iron and carbon.) In modern technology, carburization is applied to low carbon, medium carbon and alloy steels rather than to pure iron which is rather expensive. (In common usage the three classes of carbon steels are low carbon steels, up to 0.2 per cent C; medium carbon steel, 0.2 to 0.5 per cent C; and high carbon steel, above 0.5 per cent C. Alloy steels, which are defined as metallic mixtures of one or more elements of which at least one is a metal, are readily carburized. Certain differences in carbon penetration will occur in alloy steels because of the alloy content, especially with carbide forming elements such as W, Mo, Ti, and Cr.



By J. K. STANLEY
Magnetic Department
Westinghouse Research Laboratories
Westinghouse Electric Corp.
Pittsburgh

Decarburization of Steel

The four basic factors of this heat treatment are considered on the basis of equilibrium conditions and gas-metal reactions involved

If one further considers the infinitely thin sheet of pure steel formed by carburization and allows the steel to come in contact with a decarburizing medium, carbon is removed and the steel is converted into pure iron.

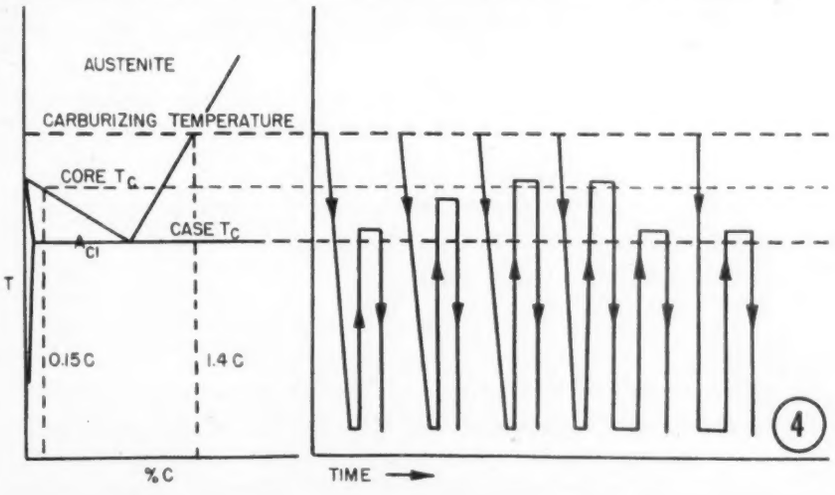
In the preceding example, the kinetics of the carburization and decarburization reaction were neglected, because in an infinitely thin sheet equilibrium was considered to take place instantly. However, for a section of finite thickness, the kinetics of carburization and decarburization must be considered. Consider the carburization and decarburization of circular and flat sections. In these cases, while equilibrium between the medium can be considered to occur immediately at the outer layer of the iron or steel, as the situation may be, the interior of the iron or steel is far from equilibrium with the medium. The carbon in carburization of a heavy section is not assimilated instantly but requires a finite time to diffuse into the metal. Decarburization, of course, is time dependent also.

If the carbon content at a given penetration is determined for either carburization or decarburization and is plotted against the distance toward the center, carburization and decarburization curves are obtained. The earliest carbon penetration curve, Fig. 1, is that of Roberts-Austen[1] published in 1896, and reproduced because of historical interest. Carbon has been added to about 8 mm; the decrease in carbon from 8 to 32 mm is unexplained.

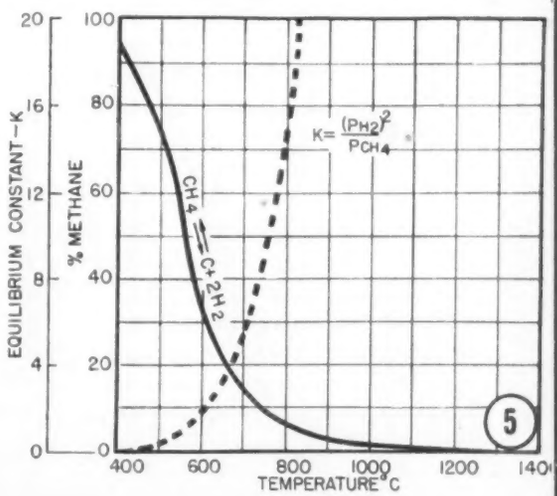
Carburization is of extreme importance in our machine age. Many of the components of automotive engines are carburized to give hard wear-resistant and fatigue-resistant (the case formed by carburization raises the endurance limit of materials used in alternating stress) surfaces on relatively ductile, tough and consequently, shock-resistant cores. Low and medium carbon steels are carburized to form a carbon gradient—or a case, as it is commonly known—with high carbon on the surface with a lower carbon core. The surface is then generally hardened by heat treatment so that it will be wear and fatigue resistant.

Typical automotive parts made by carburizing low carbon steels are shackle bolts, shifter forks, valve rocker arms, ring gears, water pump shafts, brake and clutch pedal shafts, roller bearings, etc. Parts made from medium carbon steels are transmission gears, transmission main shafts, drive pinions, etc. Practically all automotive gears are carburized.

Many steel products of the metal industries are heat treated, i.e. quenched and tempered, to bring out the necessary hardness and strength. Examples might be spline shafts, flat and helical springs, tool steels, etc. If decarburization should occur during the heat treatment of such items, the purpose of the treatment would be defeated. Instead of having a hardened surface there would be soft spots. In the case of springs very little decarburization can lead to significant reduction in the fatigue resistance. In other words, decarburization is generally to be avoided and can occur if heat treatments are not carried out properly. There are cases, however, where decarburization is deliberately sought. In the electrical industry decarburization improves the core loss of transformer strip[2]. The tremendous effect to carbon on hysteresis loss of iron was early demonstrated by Yensen[3]. Recently Low and Gensamer[4] have decarburized low carbon steel at a low temperature and obtained a ma-



4



5

terial without a yield point. Kovar for glass-metal seals has to be decarburized to obtain a good seal[5].

Carburization can be carried out by three media: Solid, liquid and gas. Carburization by solids, while rare and impractical, is possible; it is possible to carburize iron in a vacuum by means of diamond dust[1]. Giolitti [6] states that intimate contact of carbon with steel even under pressure results only in very slight carburization and Jominy[7] finds no carburization by soot even at 1260° C. (Dr. T. D. Yensen, Westinghouse Research Laboratories, in an unpublished research found no carburization with charcoal or lampblack up to 1100° C for 1 hour in vacuum but did find considerable carburization (3-4 per cent carbon) after 1 hour at 1200° C.) Most carburization is done either by gas or liquid carburizers. Gaseous carburization is commonly done in two ways: By "pack" carburizing, or by the use of special atmospheres. By "pack" carburizing is meant that the work to be carburized is covered with carbonaceous mixtures such as porous charcoal and alkaline earth carbonates.

At carburizing temperatures, a carburizing atmosphere results from this carbonaceous material. In the case of atmospheres, the work is put into furnaces and specially prepared gases come into contact with the work to be carburized. Carburizing by liquid media is done in molten salt baths such as cyanides or in neutral baths of sodium or calcium chloride to which have been added calcium cyanamid, cyanides, or carbides. Generally some nitrogen is introduced into the work with any of these liquid carburizers, and serves the useful function of increasing the hardness by forming nitrides.

Decarburization results when pack carburizers are wet or spent and when gas atmospheres are improperly adjusted. Liquid salts can also decarburize if not properly adjusted. Deliberate decarburization is usually carried out in wet hydrogen.

The subsequent discussion will be restricted to gaseous carburization.

Carburization of iron or its alloys involves the following factors:

(1) Available carbon in the carburizing gases.
(2) Interaction of the carburizing gases with the steel sample. Chemisorption and the solubility limit.
(3) Diffusion of the absorbed carbon.
(4) Heat treatment of the resulting structure to produce the desired mechanical properties.

Each of these divisions will be considered in more detail.

Available Carbon In Carburizing Medium

Gas carburization is carried out usually by two types of reactions: The carbon monoxide reaction

$$2CO \rightleftarrows C + CO_2 \quad \ldots\ldots (1)$$

determines the carburization of iron when it is in contact with the gas. Fig. 7 shows the behavior of the gases at elevated temperatures. The important observation to be made is that with increasing temperature less carbon is available from carbon monoxide for carburization. The equilibrium constant indicates that the formation of carbon and carbon dioxide is not favored with increasing temperature because it decreases with increasing temperature.

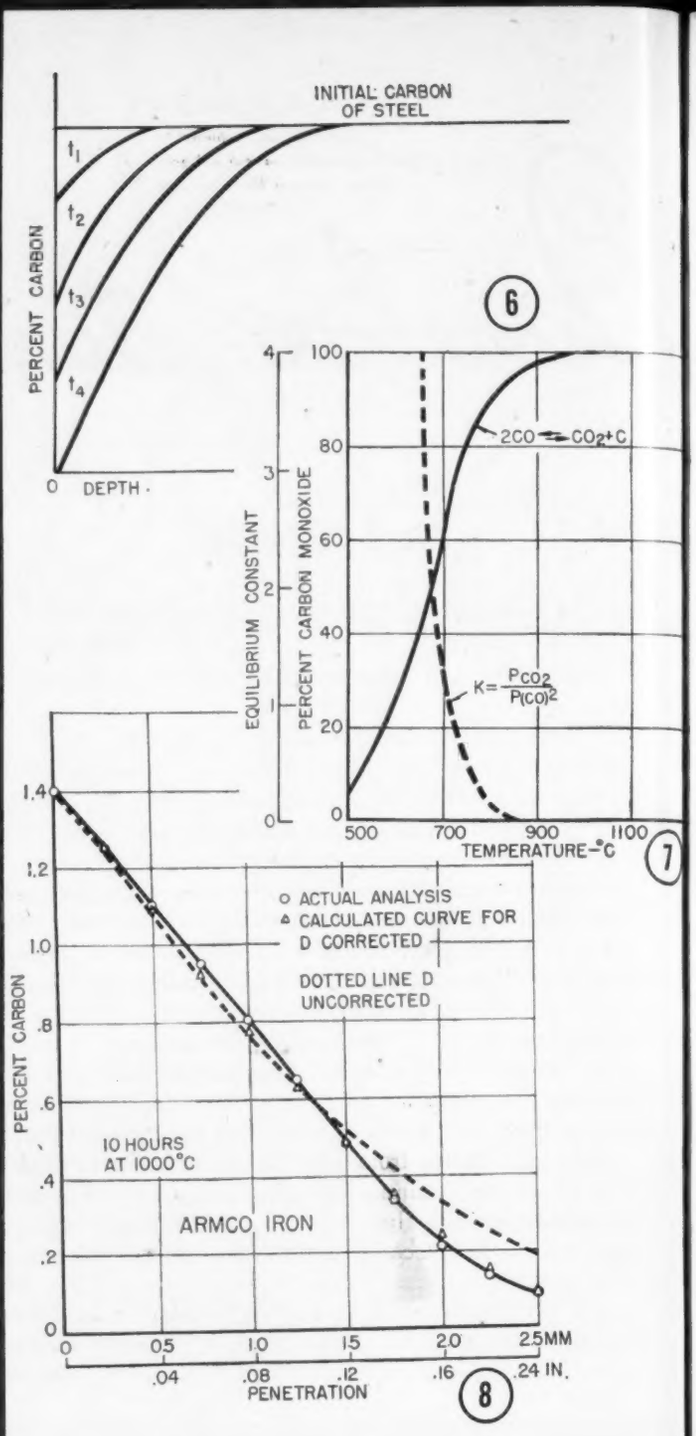
Carbon monoxide is a weak carburizer but it is a carburizer none the less. This is the carburizing constituent in "pack" carburizing. Carbon monoxide in contact with iron sets up the following equilibrium [8, 9, 10, 11];

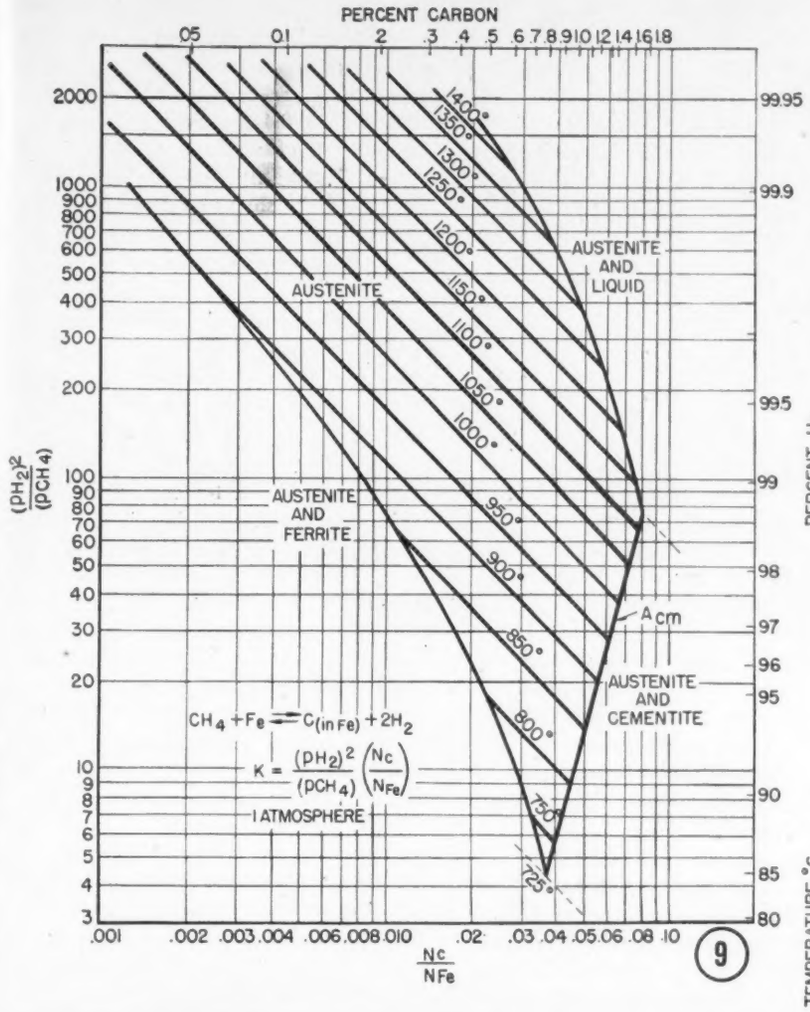
$$2CO + Fe \rightleftarrows C \text{ (in iron)} + CO_2 \quad \ldots\ldots (2)$$

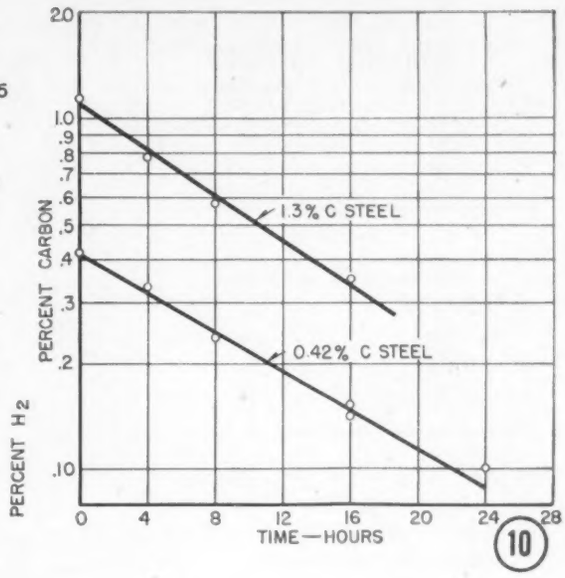
The equilibrium constant can then be expressed for this reaction:

$$K = \frac{N_C}{N_{Fe}} \frac{P_{CO_2}}{(P_{CO})^2} \quad \ldots\ldots (3)$$

Where N_C and N_{Fe} are the mol fractions of carbon and iron, respectively, and P_{CO_2} and P_{CO} are the partial pressures of the gases the mol fractions of carbon and iron, and the partial pressures of the gases are assumed as being proportional to their activities. The variation of the constant with temperature is:







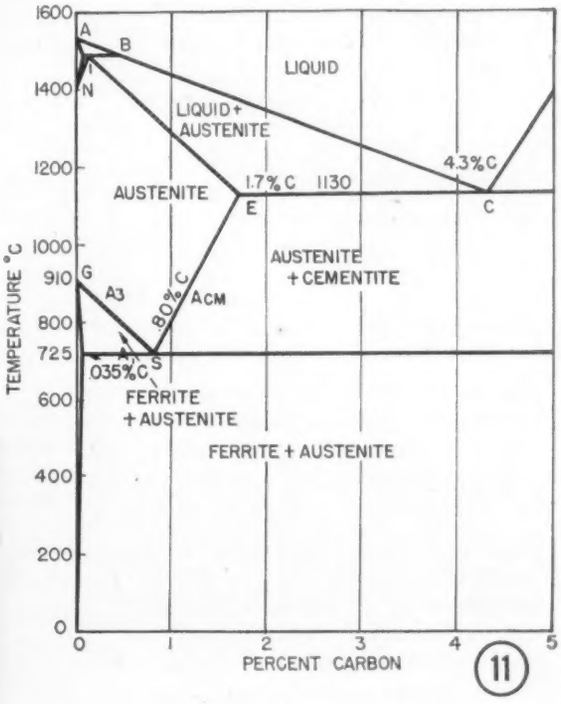


Fig. 8—Curves depicting trend of decarburization for various holding times

Fig. 7—The carbon monoxide-carbon dioxide equilibrium at elevated temperatures

Fig. 8—Comparison of actual and calculated penetration curves

Fig. 9—The equilibrium between methane and austenite

Fig. 10—Decarburization of steel in dry hydrogen at 1050° C

Fig. 11—Iron-carbon equilibrium diagram

$$\log_{10}K = -8.43 + \frac{6560}{T} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where T is in degrees absolute.

From a knowledge of the equilibrium constant one can find which gas mixture is in equilibrium with steel of a certain carbon content at any temperature. More will be said about this equilibrium presently.

Many hydrocarbons can and are used for carburizing atmospheres. The higher paraffin hydrocarbons can be considered to decompose as follows:

$$C_nH_{2n} + 2 \rightarrow CH_4 + (n-1)H_2 + (n-1)C \quad \ldots\ldots (5)$$

Some of the carbon may be available for carburization although if carbon deposition is too great, sooting will occur and the soot will mechanically obstruct carburization. Nevertheless the methane formed is still a very good carburizer. Atmospheres have been prepared from propane, butane, turpentine, benzene, gasoline and other organic materials such as aniline and methyl cyanide.

The methane recation, which one can consider representative of carburization by hydrocarbons, is as follows:

$$CH_4 \rightleftharpoons C + 2H_2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Behavior of methane at elevated temperatures is very much different from that of carbon monoxide. Fig. 5 shows the equilibrium. The figure shows that with increasing temperature the methane decomposition is in-

TABLE I

0.45 CARBON STEEL IN EQUILIBRIUM WITH CO-CO_2 MIXTURES

Temperature ° C	Gas Mixture (1 atm)
850	89% CO Bal CO_2
900	93.7
950	96
1000	97.2
1050	98.2

TABLE II

0.45 CARBON STEEL IN EQUILIBRIUM WITH CH_4-H_2 MIXTURES

Temperature ° C	Gas Mixture (1 atm)
850	2.7% CH_4 bal H_2
900	1.8
950	1.2
1000	0.85
1050	0.5

creased. This means that with increasing temperatures more and more methane is decomposed and more carbon is available for carburization. The equilibrium constant for the gas reaction increases with temperature indicating that the formation of carbon and hydrogen is favored.

In contact with iron the methane reaction can be written:

$$CH_4 + Fe \rightleftharpoons C(\text{in Fe}) + {}^{m}2 \quad \ldots\ldots(7)$$

and the equilibrium constant becomes:

$$K = \frac{N_C}{N_{Fe}} \frac{\left(P_{H_2}\right)^2}{P_{C_{H_4}}} \quad \ldots\ldots(8)$$

The variation of the constant with temperature is:

$$\log_{10} K = 4.574 - \frac{5310}{T} \quad \ldots\ldots(9)$$

Here again from a knowledge of the equilibrium constant we can find that gas mixture is in equilibrium with steel of a certain carbon content at any temperature.

Commercial carburizing atmospheres are mixtures of many gases but the carburizing agents are the hydrocarbon gases, primarily, and carbon monoxide to a considerably lesser degree. Quite often carbon monoxide—carbon dioxide mixtures with nitrogen from combustion by air are used for carriers of hydrocarbons which do the carburizing. Other gases, of course, such as nitrogen alone, or hydrogen can be used as carriers.

At this point it is necessary to introduce the iron-carbon equilibrium diagram, Fig. 11, the oldest and probably the most important of constitutional diagrams.

Commercial carburizing is conducted above the A_3 since the steel is in the austenitic condition. Above the A_3 the gamma-iron has a relatively high solubility of carbon as compared to alpha-iron; also the higher temperature facilitates the diffusion of carbon. Carbon can be added to the steel surface, in the austenitic condition, to the content given by the A_{cm} line. This represents the limit of solid solubility and no more carbon can be added.

The relation between the carburizing atmosphere which is in equilibrium with the iron or steel can now be shown. In the equilibrium

$$K = \frac{N_C}{N_{Fe}} \frac{P_{CO_2}}{(P_{CO})^2} \quad \ldots\ldots(3)$$

the ratios of the mol fractions and the partial pressures can be plotted as rectangular hyperbolas but it is more simple to plot the ratios on log-log paper where straight lines result. In Fig. 2 the ratio of the partial pressures is plotted as the ordinate while the mol fractions are plotted as abscissae. Since it is not obvious what percentages of the gases correspond to the gas ratios and what carbon contents correspond to the mol fraction ratios, this supplementary information is included on the figure.

Fig. 2 shows the equilibrium between carbon monoxide-carbon dioxide and steel at various temperatures and one atmosphere pressure. A 0.65 per cent carbon steel at 950° C will be in equilibrium with a gas mixture of 97 per cent carbon monoxide and 3 per cent carbon dioxide. If this gas mixture were to change so that there were only 95 per cent carbon monoxide in it, the steel would decarburize to a 0.43 per cent carbon steel. On the other hand if the carbon monoxide content were increased to 98 per cent the steel would be carburized to a 0.95 per cent carbon steel.

Fig. 2 also shows that higher carbon-monoxide concentrations are required to remain in equilibrium with the steel as the temperature is increased. For example, a 0.45 per cent carbon steel is in equilibrium with various gas mixtures at the temperatures indicated in Table I.

The figure also shows the greatest amount of carbon it is possible to introduce into a steel at a given temperature; this limit is shown by the A_{cm} line. Any gas containing over 99 per cent carbon monoxide at 950° could not add more than 1.3 per cent carbon to the steel because of the limitation imposed on it by the A_{cm} line. Any gas containing over 99 per cent carbon monoxide still would carburize to 1.3 per cent carbon but the additional carbon available in the gas would be deposited as soot.

Another important equilibrium is that of methane-hydrogen[12]. Fig. 9, plotted from Schenck's data, shows the equilibrium of iron and methane-hydrogen mixtures at one atmosphere pressure at various temperatures. A 0.65 per cent carbon steel at 950° C will be in equilibrium with a gas containing 1.8 per cent methane and 98.2 per cent hydrogen. A decrease in methane to 1 per cent would lower the equilibrium carbon content of the steel to 0.4 per cent carbon while an increase of methane to 3 per cent would increase the equilibrium carbon content of the steel to 1.2 per cent.

Fig. 9 also shows that lower methane concentrations are necessary to remain in equilibrium with a steel as the temperature is increased. For example, a 0.45 per cent carbon steel is in equilibrium with methane gas mixtures at temperatures indicated in Table II.

This sort of equilibrium information about carbon monoxide and methane is mostly of academic interest because it is commercially difficult, though possible[13], to apply it to the control of atmospheres so that they are in equilibrium with a given steel. (Furthermore the total pressure of the CO and CO_2 constituents must be considered. The equilibria between steel and these gases are affected by the total pressure. While the equilibria at various pressures can be calculated the results are of questionable benefit.) What is generally done is to saturate the steel surface at a certain temperature; the solid solubility of the steel at a certain temperature determines the amount of carbon it is possible to add. If a sharp carbon gradient starting from the carbon content given by the solid solubility at the carburizing temperature is not desired, a subsequent heat treatment in a neutral atmosphere can be used to diffuse the carbon in order to reduce the surface carbon.

Gas-Iron Surface Interaction

Decomposition of carburizing gases on the iron surface can be considered a case of activated absorption which is a necessary preliminary to solution of the carbon and its diffusion. However, very little appears to be known about it.

Activated absorption or chemisorption depends upon the chemical attraction between the gas and the metal surface. The absorbed polyatomic gas on the metal surface will dissociate into atoms, or at any rate, a weakening of the bond occurs between atoms so as to cause a partial dissociation of molecules, probably something on this order

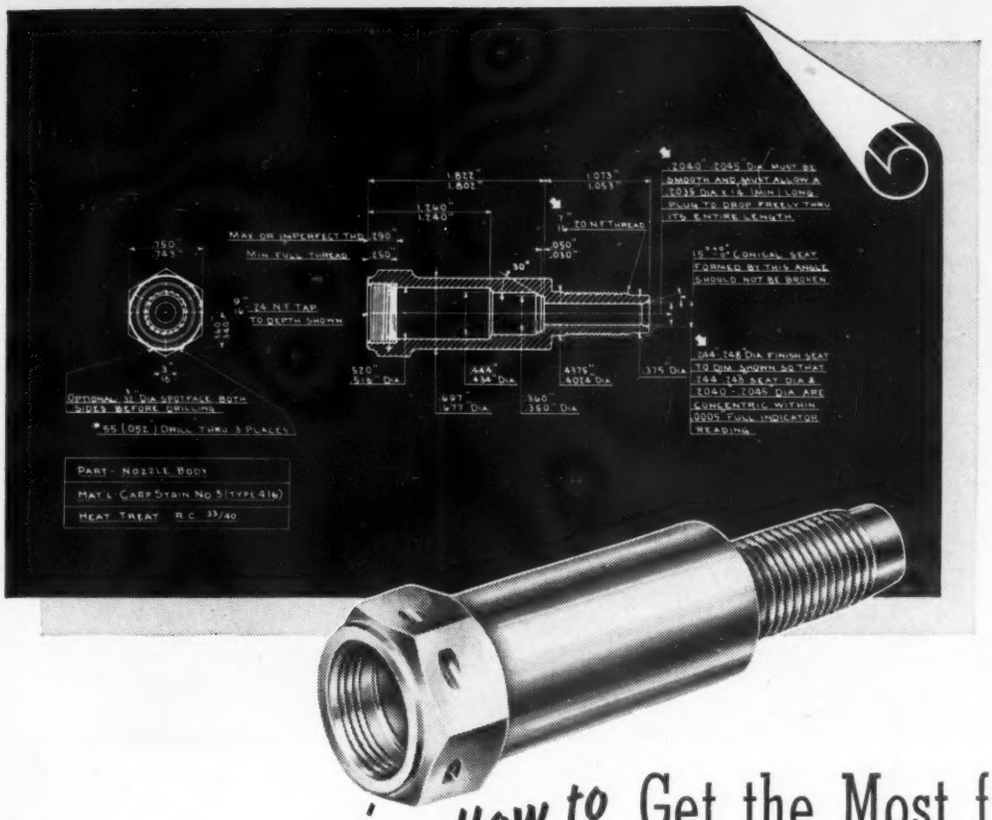
$$CO \rightarrow C + O \quad \ldots\ldots(10)$$

and

$$CH_4 \rightarrow C + 4H \quad \ldots\ldots(11)$$

Each of these atoms tends to dissolve in the lattice. In reaction (10) the oxygen reacts with the excess carbon monoxide present forming carbon dioxide, restricting the amount of oxygen dissolving in the iron. In reaction (11) the solution of the hydrogen is not harmful,

(*Please turn to Page* 128)



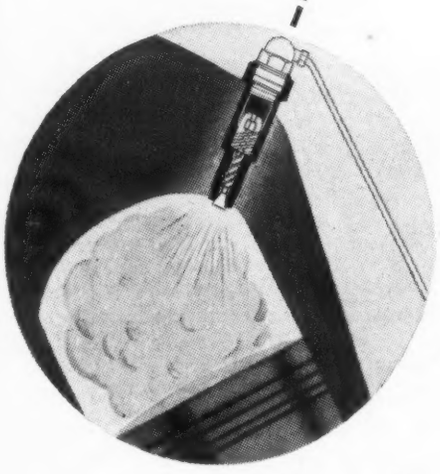
You really begin to cut machining costs when your orders specify *Carpenter* Free-Machining Stainless for precision jobs like this fuel injector part.

How to Get the Most from Stainless and Reduce Your Unit Costs!

Right now when you are looking for new ways to cut costs, take a look at your Stainless fabricating picture. For true economy, you need the right analysis of Stainless Steel for the job.

But *more* than that, you need a Stainless that is so uniform from lot to lot that you can rely upon it to respond to the same machining methods *every* time. That's why cost-minded designers and production men prefer Carpenter Stainless. Its uniformity—saves time and trouble—keeps down rejects.

Another big advantage of using Carpenter Stainless is the Carpenter experience you get along with it. Personal help and cooperation from your Carpenter representative, plus helpful printed information make it easy to get the most out of these Stainless Steels. For fast delivery on Stainless bars, call your nearby Carpenter warehouse.



Here's the First Step to Lower Costs on Stainless Jobs...

Your Carpenter representative has copies of this cost-reducing information available for management and production executives. The 96-page "Notebook on Machining Stainless Steels" will help you discover new ways to reduce your unit costs on Stainless jobs. Extra copies of this valuable book can also be supplied as a guide to the men in your shop, at 50¢ per copy. Write us, on your company letterhead, please.

THE CARPENTER STEEL COMPANY, 139 W. BERN STREET, READING, PA.

Carpenter

FREE-MACHINING

more than corrosion resistance

STAINLESS STEELS

PROMPT SHIPMENT FROM CONVENIENTLY LOCATED STOCKS

Buffalo	Cleveland	Hartford	Philadelphia
Chicago	Dayton	Indianapolis	Providence
Cincinnati	Detroit	New York	St. Louis

SEE THE CLASSIFIED SECTION OF YOUR TELEPHONE DIRECTORY

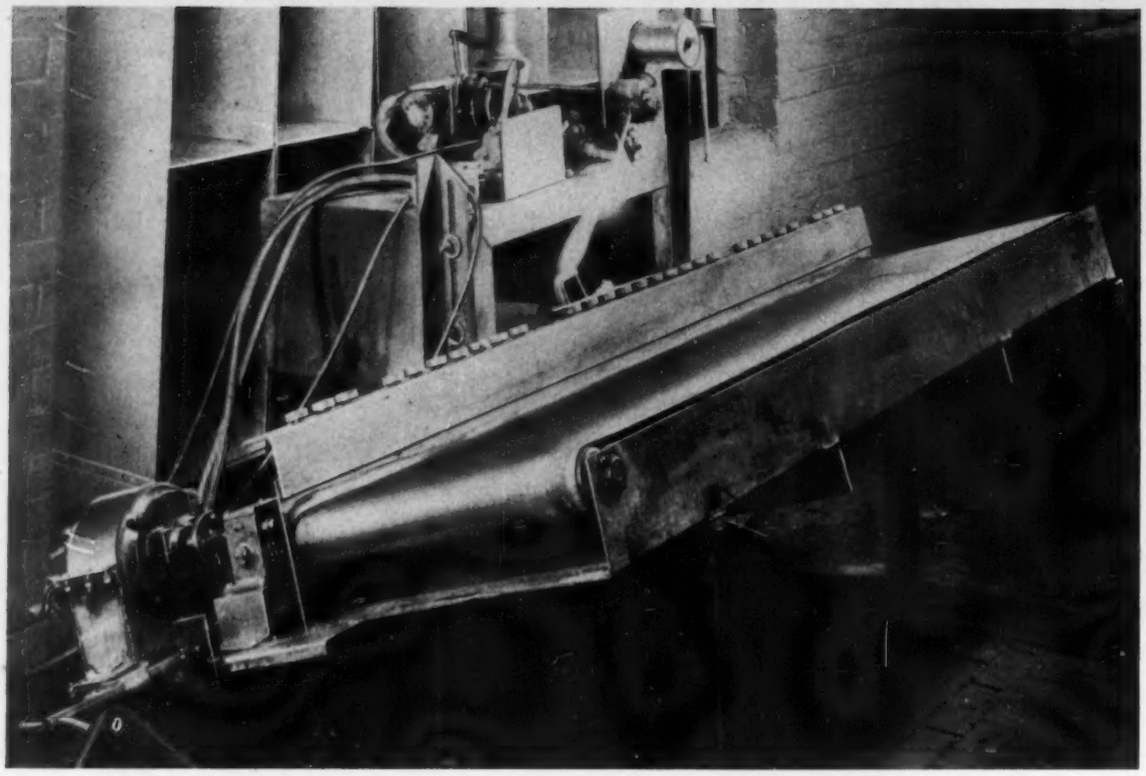


Fig. 1—Mechanized setup was constructed of angle iron and steel plate for automatic soft-soldering 20-gage steel boxes

Mechanized Soft Soldering

Production of air-conditioning units speeded by moving work at predetermined speed under fluxing brush, oxyacetylene flame and a solder feed

UNTIL the development of a mechanical setup to do the work, hand-soldering seams on 20-gage steel boxes was a production bottleneck in the manufacture of air conditioning units at Carrier Corp., Syracuse, N. Y. The operation that finally cracked the bottleneck consists in moving the work, at a predetermined rate of speed, under an oxyacetylene welding blowpipe and an automatic feeder for wire solder.

The arrangement, Fig. 1, consists of two separate assemblies mounted on a welded angle iron frame. The first is an electrically driven conveyor belt connected to a gear reduction unit. This serves the dual purpose of positioning and moving the work. It was built at a slight angle as shown so that the molten solder would have a tendency to flow into the seams rather than away from them. A switch for controlling the conveyor belt drive can be seen in the left foreground of Fig. 2.

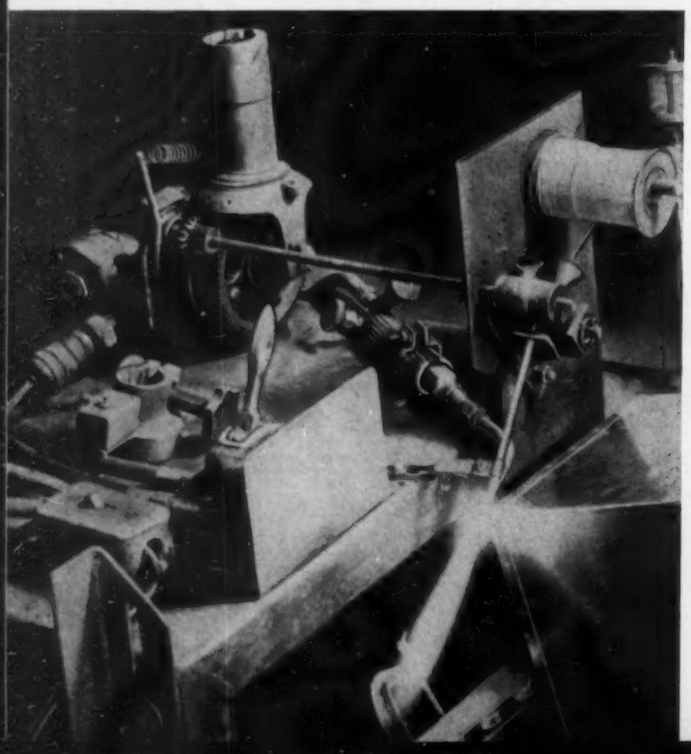


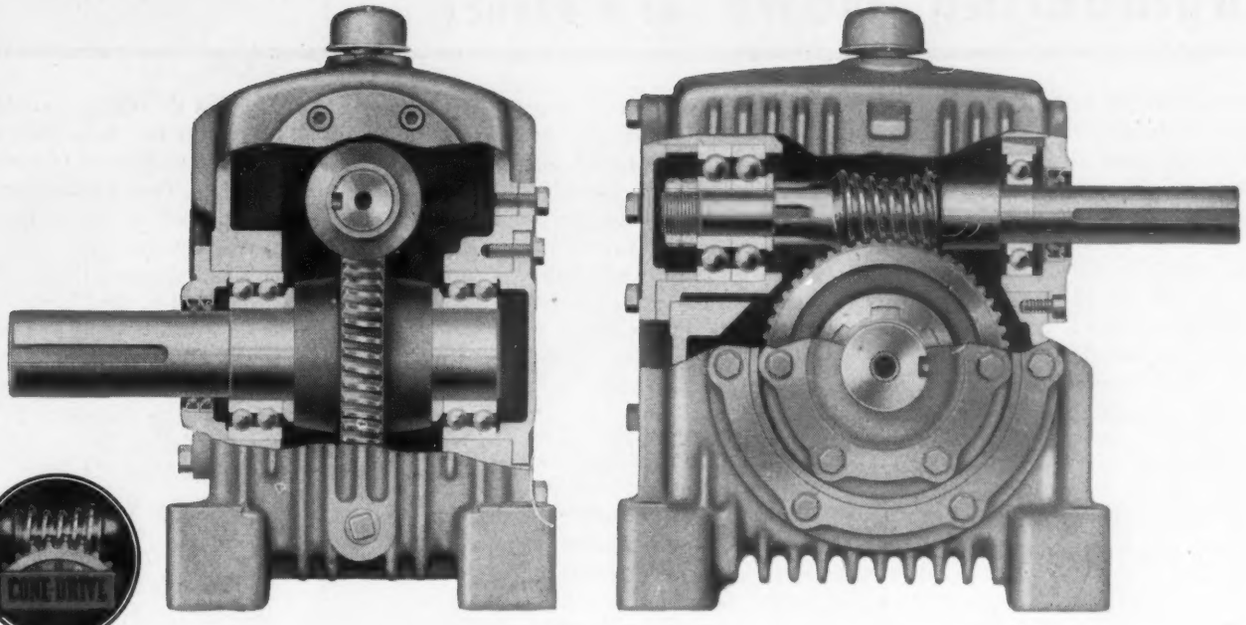
Fig. 2 — Here work is moved at a predetermined rate of speed under a fluxing brush, the flame and a solder feed

The second assembly is the soldering mechanism. The operating parts are mounted on a platform made from light steel plate. This mounting platform is hung between two angle-iron uprights, one of which is clearly visible in Fig. 2. Each upright has a slot in one leg of the frame, through which the platform is attached by two bolts. These slots permit raising and lowering the platform to adjust the height of the soldering unit.

The solder-feed mechanism is driven and controlled by the motor drive unit from an Oxweld CM-16 cutting machine manufactured by The Linde Air Products Co., N. Y. This unit is mounted by attaching the CM-16 skid to a special bracket welded to the mounting platform. The CM-16 motor-control switch attached to the blowpipe holder is placed on the platform in any convenient position. The speed of the solder feed is regulated by the governor on the CM-16 motor.

Two knurled rollers, one driven and

(*Please turn to Page* 123)



There is more beef than meets the eye in STANDARD CONE-DRIVE SPEED REDUCERS

Check this table of ratings of Standard Cone-Drive Reducers against any other make. There is beef in the compact housings too—plus plenty of cooling area. The model HO-7400 illustrated here is a 4-inch C. D. unit, ideal for conveyor drive or other materials handling applications. Note the double row ball bearings—the rigidity of the housing design.

You can't go wrong on Cone-Drive reducers. They give you greater ruggedness, increased load capacity, smaller size, high thermal efficiency, long trouble-free life. Made in pinion-under and pinion-over, gearshaft vertical or horizontal models. Available with water-cooling and extended shafts.

Write for Bulletin, giving approximate horsepower or torque and ratio required.

CONE-DRIVE DIVISION
MICHIGAN TOOL COMPANY
7171 E. McNichols Road, Detroit 12, U. S. A.

HORSEPOWER RATINGS AT 100 & 1750 PINION RPM

2 inch Center Distance		3 inch Center Distance		4 inch Center Distance		5 inch Center Distance		6 inch Center Distance		RATIO	8 inch Center Distance		10 inch Center Distance		12 inch Center Distance		15 inch Center Distance		18 inch Center Distance	
100	1750	100	1750	100	1750	100	1750	100	1750		100	1750	100	1750	100	1750	100	1750	100	1750
.35	2.96	1.24	9.04	3.00	19.8	6.07	37.0	10.4	59.1	5:1	24.4	119.2	45.8	208.	77.6	336.				
.21	1.95	.75	6.11	1.81	13.4	3.65	24.47	6.35	40.4	10:1	14.7	82.6	28.0	145.	47.1	217.	86.0	410.	133.	632.
.15	1.40	.53	4.39	1.27	9.64	2.58	18.09	4.46	29.1	15:1	10.4	61.2	19.8	105.	33.8	163.	60.5	299.	91.	446.
.11	1.10	.40	3.40	.98	7.5	2.00	13.96	3.39	22.5	20:1	7.92	46.9	15.2	81.6	26.6	131.	45.3	232.	69.	361.
.09	.86	.33	2.77	.79	6.03	1.60	11.2	2.77	18.4	25:1	6.47	38.4	12.3	66.9	21.4	106.	36.6	189.	55.5	296.
.08	.73	.27	2.32	.65	5.06	1.34	9.47	2.32	15.8	30:1	5.42	32.2	10.2	56.0	17.9	89.0	30.0	161.	46.2	248.
.06	.55	.21	1.75	.50	3.79	1.01	7.13	1.75	11.8	40:1	4.1	24.4	7.77	42.4	13.6	67.2	22.2	122.	34.2	186.
		.17	1.40	.39	3.07	.809	5.70	1.40	9.45	50:1	3.28	19.5	6.22	33.9	10.9	53.8	18.0	95.8	27.6	150.
				.33	2.54	.675	4.75	1.17	7.87	60:1	2.74	16.2	5.20	28.7	9.00	45.5	12.7	80.6	21.5	125.
						.58	4.08	1.00	6.75	70:1	2.34	13.9	4.45	24.6	7.72	39.0				

Ratings apply to both Standard Cone-Drive Speed Reducers and Standard Cone-Drive Gear Sets.

Engineering News *at a Glance*

PROVES POINT PUBLICLY: At Wright Field, Hydropress Inc. of New York, proved to more than 5000 scientists, Army and Navy officers visiting the magnesium exhibit—jointly sponsored by the Air Materiel Command and the Magnesium Association— that magnesium was safe. It proved that when properly handled the metal is not subject to any greater fire hazard than any other material. The demonstration, reported the first of its type in history, was made on the company's semiautomatic cold chamber die casting machine. The metal was melted and kept at its casting temperature in an electric furnace which was adjusted to avoid any danger of oxidation.

"ARMORED" STEEL: Development of rolled nickel or Monel clad steel strip was reported recently by Superior Steel Corp., Carnegie, Pa. The composite strip already is being made in widths beween ¼ and 10¼-in., in coils ranging up to several hundred feet—depending on the gage. Furnished with cladding on either one or both sides, the strip is expected to supplement rather than compete with solid materials. Standard cladding thickness is 10 per cent of the total thickness, or 20 per cent if the cladding is applied on both sides of the strip. Aside from chemically dissolving the steel from the cladding, it is impossible to separate the nickel or Monel from its base. Therefore, the clad strip may be stamped, drawn, spun, bent, spotwelded or otherwise fabricated in the same manner and with no more trouble than ordinary low carbon deep-drawing steel.

ONE WAY TRAFFIC: In Melrose Park, Ill., it was learned, Lindsay Corp. handles raw materials and finished products in its new plant on a "one way" basis. Through use of dual railroad sidings, raw materials enter at one side and flow directly across the plant during processing to shipping platforms and freight cars on the opposite side.

SPRAYING STAINLESS: Spraying of stainless steel is becoming a boon to the maintenance engineer. First used to build up worn stainless parts of expensive engineering equipment, the technique, thus far, has proved so successful that it has spread to additional applications. According to "News and Views," one company was experiencing a great deal of trouble with leaky pump impeller shaft sleeves caused by friction between the packing and the sleeve. In the hope that a tougher metal would stop the grooving and wear, the shaft was submitted for experimental metal spraying treatment. Results turned out so satisfactory, that now the company is stainless spraying the sleeves on new equipment. An often overlooked advantage of stainless spraying is correcting machinits' errors. Frequently a piece can be salvaged by building up the miscut part with sprayed stainless.

MEASURES METALLIC GRAINS: An important contribution to the metallurgy field was made recently with the development, at Westinghouse research laboratories, of a new device for rapid and precise determination of metallic grain sizes. The comparator provides for counting the grains in a certain area or estimating their extent by comparison with a series of standard photographs. It is simply a small portable attachment for a standard metallograph, and consists of a ground-glass screen hinged to an illuminating unit with a slotted wooden frame.

FAST TUB DRAWING: In Toledo, O. it was learned, Acklin Stamping Co. currently is drawing slightly over 110 laundry tubs per hour of sheet Monel metal 0.037-in. thick from a blank 31 in. diameter. Reduction to the finished diameter is about 45 per cent. At the plant, the draw operation is performed in a HPM 400-ton hydraulic triple-action press that provides a blank holding pressure of 18 tons. Three men are involved in the operation. The first separates the circle sheared blanks and applies Amplex 0 and Shell No. 1 or vegetable compound to both sides. Second man places blank in the die and starts the press. A third operator then removes the drawn tub from the die, and places it on a lift truck heading for the shipping department.

TO REDUCE FIRE HAZARDS: An important insulation development, illustrative of close co-operation between government and industry, is now well on its way to soon come off production lines of American laminated plastic manufacturers, it was learned from Formica Insulation Co. in Cincinnati recently. Out of this "joint enterprise" involving the Navy and private industry has come a new material—glass-silicone insulation, which although still in development stage, is 85 per cent inorganic and is highly fire and arc-resistant. With the material, electrical equipment operating up to 400° F has already been safely insulated. It also is said to provide a 30 per cent saving in weight and 65 per cent saving in space. Tests on the material are still progressing at Johns Hopkins laboratory which was originally financed by the laminated plastics industry and is now being operated by the Navy under a temporary arrangement whereby the latter covers the operating overhead. The Navy plans to share its development with industry, and to encourage its use. Particularly interesting is the fact the laminators—competitors in their own field and the suppliers of resin, glass, silicone and other items, also in a highly competitive position, literally "joined hands" and pooled their individual know-how to form a research chain in this project.

INGENUITY PAYS OFF AGAIN: Welding production of steel shells 16 ft in diameter was increased by about 50 per cent through the ingenuity of engineers in the plant of McJunkin Supply Co., Charleston, W. Va. Discovering they could not pick up equipment to help weld the shells continuously and economically, they produced a welding dolly that just filled the bill—one that handles shells from 16 ft in diameter and up to 40 ft in length, revolving them from nine to 90 ft per hour, and capable of holding a capacity load of 35 tons. The dolly consists of two rows of pulleys, each 10 in. diameter. One row is joined on a 1 15/16-in. shaft 40 ft long; this shaft is revolved by a 3-hp motor in conjunction with a variable speed control driving through a speed reducer, the ratio of which is 900 to 1. Pulleys of the other row revolve on individual shafts. They may be moved forward or backward to accommodate shells of various diameters.

INTERCHANGEABLE ENGINES: Military development of interchangeable gasoline engine cylinders from which three families of engines in a wide range of horsepower may be made is the latest contribution of the Army to industrial progress. This was reaveled recently with the announcement by the Chief of Army Ordnance's Research and Development Service that commercial production of the new standard cylinders and engines made from them is now permitted. Concept of the standardization of individual, air-cooled cylinders is radical in that many different engines may be made essentially by the process of assembling a given number of cylinders and supplying proper crankshaft for each

CMP LONG COILS

for less downtime, more production

● In many grades of CMP Thinsteel you can specify extra long coils—up to 300 lbs. per inch of width. It's a good start on stepping-up production and cutting costs with your automatic equipment. With less downtime your equipment gives you more production without interruptions.

And don't forget your requirements in cold rolled strip steel in all CMP grades will be met with unvarying coil after coil accuracy. Why not check on your needs with CMP right now?

COLD FACTS ON THINSTEEL

- **EXTRA LONG COILS** *..less downtime*
- **EXTREMELY CLOSE TOLERANCES** *...more parts per ton*
- **WIDE RANGE OF PHYSICALS AND ANALYSES** *...tailored for your products*
- **GAUGES THIN AS .001"** *...strength with lightness*
- **LOW CARBON, STAINLESS AND ALLOY GRADES**

CMP PRECISION COLD ROLLED

GIVES MAXIMUM PRODUCTION PER TON

STRIP STEEL THINSTEEL

THE COLD METAL PRODUCTS CO.
YOUNGSTOWN 1, OHIO

Sales Offices
NEW YORK • CHICAGO • DETROIT • ST. LOUIS
BUFFALO • DAYTON • LOS ANGELES

engine. Of the two cylinders now available, one is square with a 5¾-in. bore and 5¾-in. stroke, while the other has a 4⅛-in. bore and 4-in. stroke. With the larger, combinations already have been worked out for a horizontally opposed 6-cylinder engine, a V-8, and a V-12. Range for this group is 375 to more than 1000 hp. From the smaller cylinder, three horizontally opposed engines of 4, 6 and 8 cylinders and a horsepower range of 100 to 300 have been worked out. Universal interchangeability of all high-mortality parts such as cylinder liners, pistons and piston rings, pins, valve, electrical accessories and other parts within each family of engines is assured under the new cylinder-assembly plan.

WEATHERVANE LANDINGS: Tricky crosswind landings or take-offs may be made in relative safety by planes using a device developed recently by Goodyear Aircraft Corp., Akron, it was revealed. The new landing gear allows aircraft a yaw of 25 degrees on either side of center while maintaining a straight landing or take-off roll. It incorporates a kingpin, on which the wheel pivots, as an integral part of the wheel assembly. In order to obtain the desired pivot, Goodyear engineers angled the kingpin 30 degrees with the ground in such a manner the point of intersection with the ground would be ahead of the tire point of contact. Surrounding the pin is a stationary compensating cam in the horizontal plane so arranged that it will raise the plane slightly as the wheels pivot, thus providing necessary static stability. Static stability is obtained by a cam follower which rides in the compensating cam at the base of the kingpin and is attached to the aircraft axle. Main wheel bearings ride between the kingpin housing of hub, and the wheel itself. The cylinder is anchored to the hub while the brake disk—single disk type—is splined to the wheel in the usual manner.

MATERIAL-MAKING TECHNIQUE: Great improvement of a wide variety of important industrial processes, including the manufacture of gasoline, lime and powdered coke is promised by a new technique for controlling chemical reactions of powdered materials, Professor Edwin R. Gilliland of MIT told members of the Rochester section of the American Chemical Society recently. The fluidized powder technique, which consists of suspending a powder in a stream of gas or liquid flowing upward, is finding its main use in the fluid catalytic cracking process, vital in the production of gasoline. It also is being developed for a number of other purposes, he said, such as burning limestone to make lime, oxidation of hydrocarbon compounds typical of petroleum, manufacture of fuel gas from coal, processing of powdered coal into coke and similar operations. In the process, he explained, the mixing of the solid and the transfer of heat from the solid to the stream of gas are so rapid and thorough that constant temperature can be maintained even when heat is being produced unevenly.

MAY AFFECT OHIO INDUSTRIES: Several legislative amendments now up before the Ohio Senate in Columbus, if passed, will put many engineering corporations out of business and may seriously curtail, if not entirely eliminate, engineering activities of industrial corporations in the state, it was pointed out recently by the Cleveland Chamber of Commerce. Introduced in form of Senate Bill 80, the legislation makes several important changes to an act relative to the qualifications, registration and practice of professional engineers and surveyors. One of the amendments, the chamber reports, would exclude corporations, even those now in existence, from using the corporate form, and present engineering corporations would have to go back to a partnership basis or go out of business. Of almost equally grave import to industry is the fact that definition of the term "practice of professional engineering," contained in the present law and retained in the bill, is so broad that it would undoubtedly prevent any industrial corporation from maintaining an engineering department.

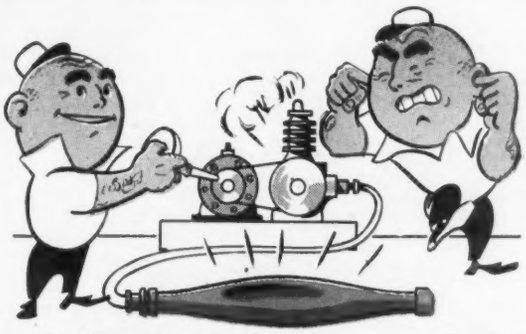
SPUR FOR THE "CYCLOTRON SPECIAL": To deliver the massive magnet forgings for the new 1200-ton super atom smasher being installed at the University of Rochester, the Erie Railroad recently laid a special 473-ft spur into the university's campus. Ten forgings, such as the 157-ton giant shown above, were transported directly to the emplacement site where the machine is being assembled. Heavy duty 16-wheel flat cars were required for the job, and special precautions observed in transit. Cars bearing forgings were located at least four car lengths from the locomotive to prevent excessive loading of bridges and road bed. Empty cars weighing under 100,000 lb each were required at either side of the special flat cars to act as buffers

IRON FROM SHALE: If American high-grade iron ore or coking fuel sources run low, the German Krupp-Renn process may offer a satisfactory method of reducing iron-bearing sandstone shale and other plentiful low-grade ores containing as little as 30 per cent iron, a report held by the Office of Technical Services, Washington, reveals. According to Theodore L. Johnston, metallurgist in charge of the U. S. Bureau of Mines' sponge iron pilot plant at Laramie, Wyo., direct reduction of low-grade ores in rotary kilns may assume great importance in the United States within 10 to 20 years because of the rapid depletion of ores suitable for blast furnaces—ores containing over 50 per cent iron. Experiments at Laramie, he said, show the Krupp-Renn process makes possible local reduction of ores too poor for blast furnaces in areas where it has not been previously practical. The process can be carried on with relatively cheap kilns, is economical for small as well as large-scale production, and does not require continuous operation. Common and waste fuels such as coke breeze, powdered lignite, roundhouse cinders, and practically any low-grade fuels containing carbon proved adequate in tests.

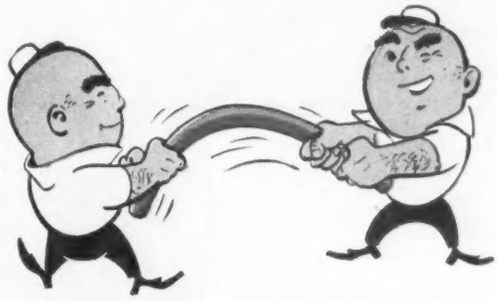
For men who won't take wooden nickels

The welcome mat at Bundy is always out for men who won't take wooden nickels.

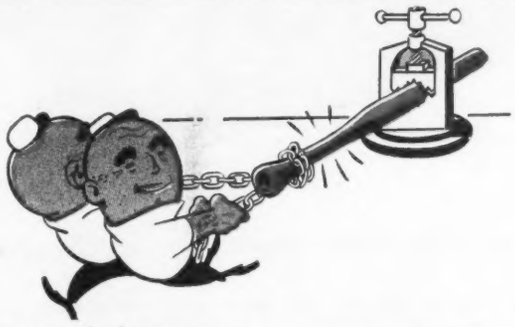
Manufacturers have a right to be skeptical until they've seen the proof that Bundyweld Steel Tubing is *superior . . . different.* And to provide that proof, here's the story of superiority our design engineers tell:



1 **IN PRESSURE** applications, for example, Bundyweld ¼" x .028" Annealed Steel Tubing has an ultimate bursting strength of 12,500 pounds per square inch.



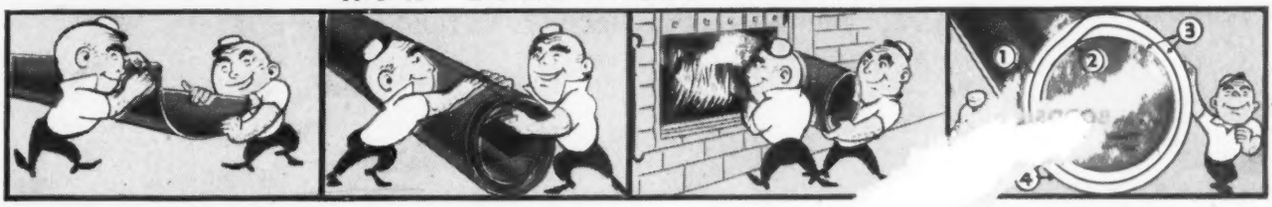
2 **WHERE VIBRATION** occurs, Bundyweld counters with a record of unusually high fatigue strength to insure against failures.



3 **BUNDYWELD'S** ultimate tensile strength (annealed) is 45,000 to 52,000 P.S.I. . . . yield strength, 30,000 to 36,000 P.S.I. . . . percent elongation in 2", 30% to 40%.

4 **WHEN IT** comes to temper, Bundyweld Steel Tubing can be furnished either with a soft anneal or hard drawn as required.

HOW BUNDYWELD IS MADE



Bundyweld Tubing is made by a process entirely different from that used in making other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice laterally . . .

. . . into tubular form. Walls of uniform thickness and concentricity are assured by the use of close tolerance cold rolled strip. This double rolled strip passes through a furnace where the . . .

. . . copper cop . . . alloys with th . . . alls. After h . . . ing, it beco . . . ole wall steel . . . brazed throughout . . . wall contact . . .

. . . copper coated inside and out, free from scale, closely held to dimensions. Hard or annealed in standard sizes up to ⅝" O.D. Special sizes cold drawn to specifications.

No wonder, then, that Bundyweld Steel Tubing is specified by hundreds of discerning manufacturers for products ranging from motor vehicles to refrigerators and from gas ranges to Diesel engines. If your requirement is for outstanding mechanical properties, let us tell you more about Bundyweld. Also available in nickel and Monel. Write: *Bundy Tubing Company, Detroit 14, Michigan.*

BUNDY TUBING

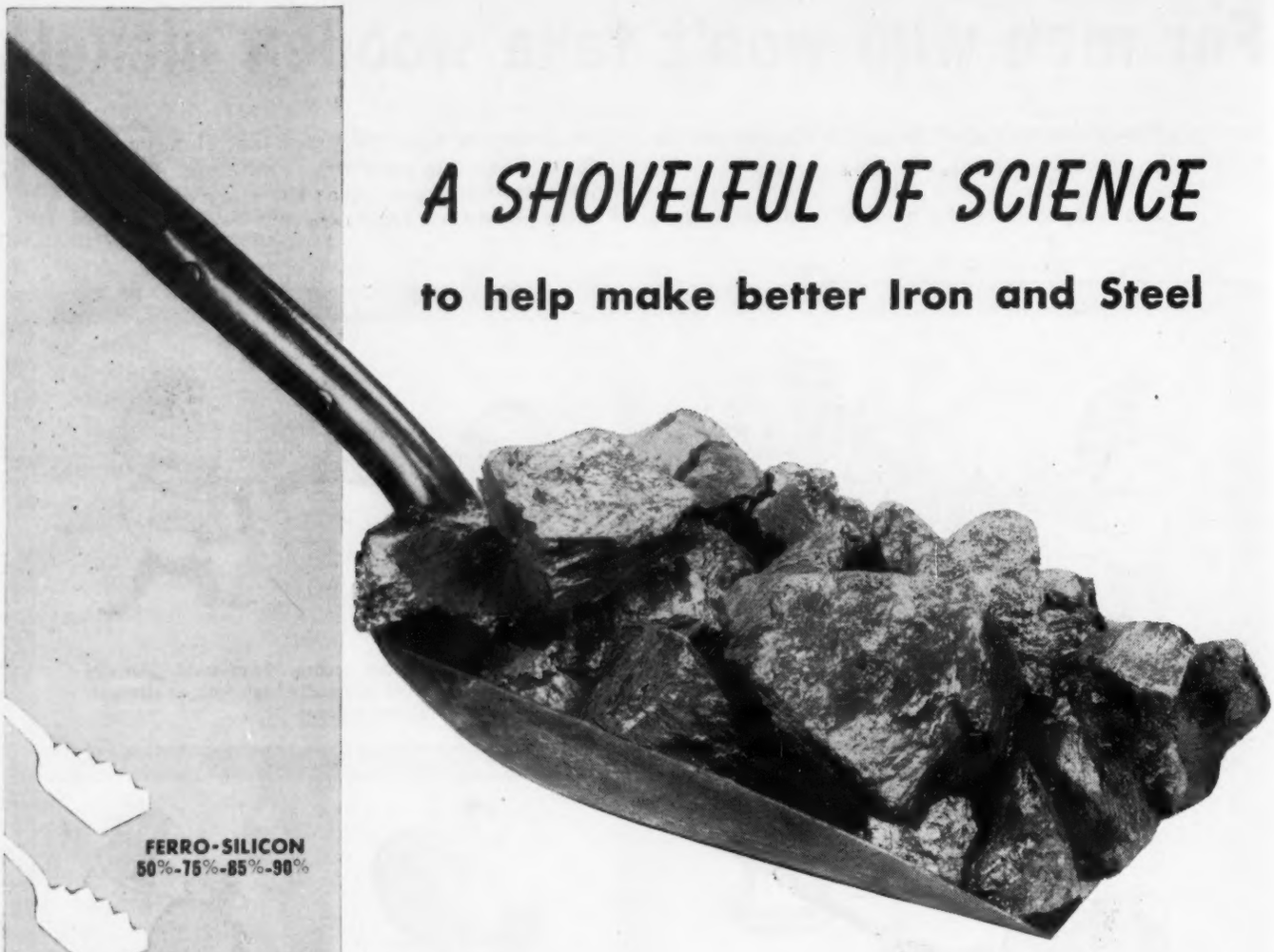
★ ★ ENGINEERED TO YOUR EXPECTATIONS ★ ★

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

Pacific Metals Co., Ltd. 3100 19th St. San Francisco 10, Calif.	Standard Tube Sales Corp. 1 Admiral Ave. Maspeth, N.Y.C., N.Y.	Lapham-Hickey Co. 3333 W. 47th Place Chicago 32, Illinois	Rutan & Co. 404 Architects Bldg. Phila. 3, Pa.	Eagle Metals Co. 3628 E. Marginal Way Seattle 4, Wash.	Alloy Metal Sales Ltd. 861 Bay St. Toronto 5, Canada

A SHOVELFUL OF SCIENCE

to help make better Iron and Steel



FERRO-SILICON
50%-75%-85%-90%

SPECIAL BLOCKING
50% FERRO-SILICON

FERRO-CHROME

FERRO-MANGANESE

BOROSIL

SIMANAL

SILICON - MANGANESE - CHROME
Briquets

Into the production of Ohio Ferro-Alloys goes the scientific knowledge resulting from years of practical experience, research and development work.

In every shovelful of Ohio Ferro-Alloys, the consumer obtains a consistent chemically-and-metallurgically-controlled product that insures uniform results in his melting practice.

© OFA 1935 © OFA 1941

PHILO BRAND — DEPENDABILITY · QUALITY · SERVICE

RAINIER BRAND — DEPENDABILITY · QUALITY · SERVICE

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

Assembling ELECTRIC LOCOMOTIVES

One-hundred-eighty-two-ton giants, slated for Paulista railway, built by GE on mass production basis

MASS production methods are speeding the manufacture of 182-ton, 3000-v direct current electric passenger locomotives for the Paulista railway of Brazil in the locomotive shops of General Electric Co., Erie, Pa. Twelve of these locomotives have already been shipped.

Built for operation over mountainous terrain involving gradients as great as 1.85 per cent, the locomotives are rated continuously at 4050 hp with an hourly rating of 4470 hp. With an overall length of 76 ft, weight on each of six driving axles is 45,000 lb for a total of 270,000 lb on driving axles.

The 2-axle guiding trucks and two articulated 3-axle driving trucks are completely fabricated by welding. Of all-steel, all-welded construction, the cab underframe is composed of two main 21-in. I-beam longitudinal sills welded to cross sills and further braced and supported in position by heavy floor plate. The main air duct is a chamber formed in the space between the main longitudinal sills. Considerable saving of time and labor is said to be realized by this method in elimination of extensive machining and handling large heavy parts.

Cab sides and ends are built of separate assemblies set in position on the underframe and then welded in place. The roof, consisting mainly of covered hatches, is constructed and assembled on the locomotive in a similar manner.

The high-voltage compartment, entirely enclosed and occupying the center section of the main apparatus cab, is designed to permit the complete installation of electrical equipment before the compartment itself is installed in the locomotive. After assembly inside the cab, the complete unit is welded into place and final electrical connections are made. This compartment is equipped with removable side covers to give access to the equipment while end doors furnish entry to the compartment interior.

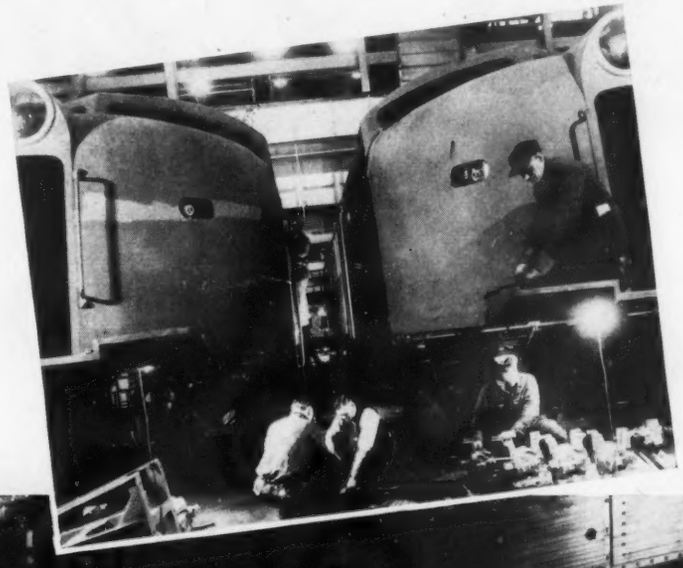
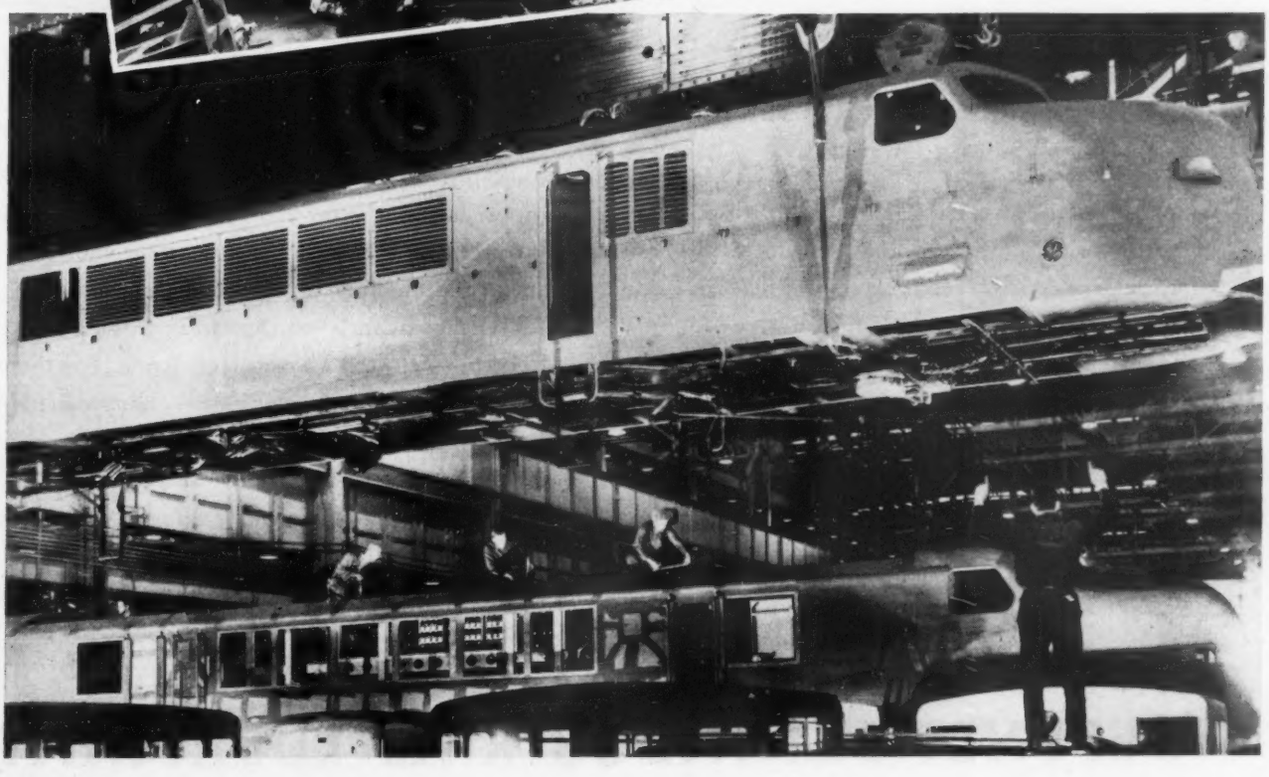
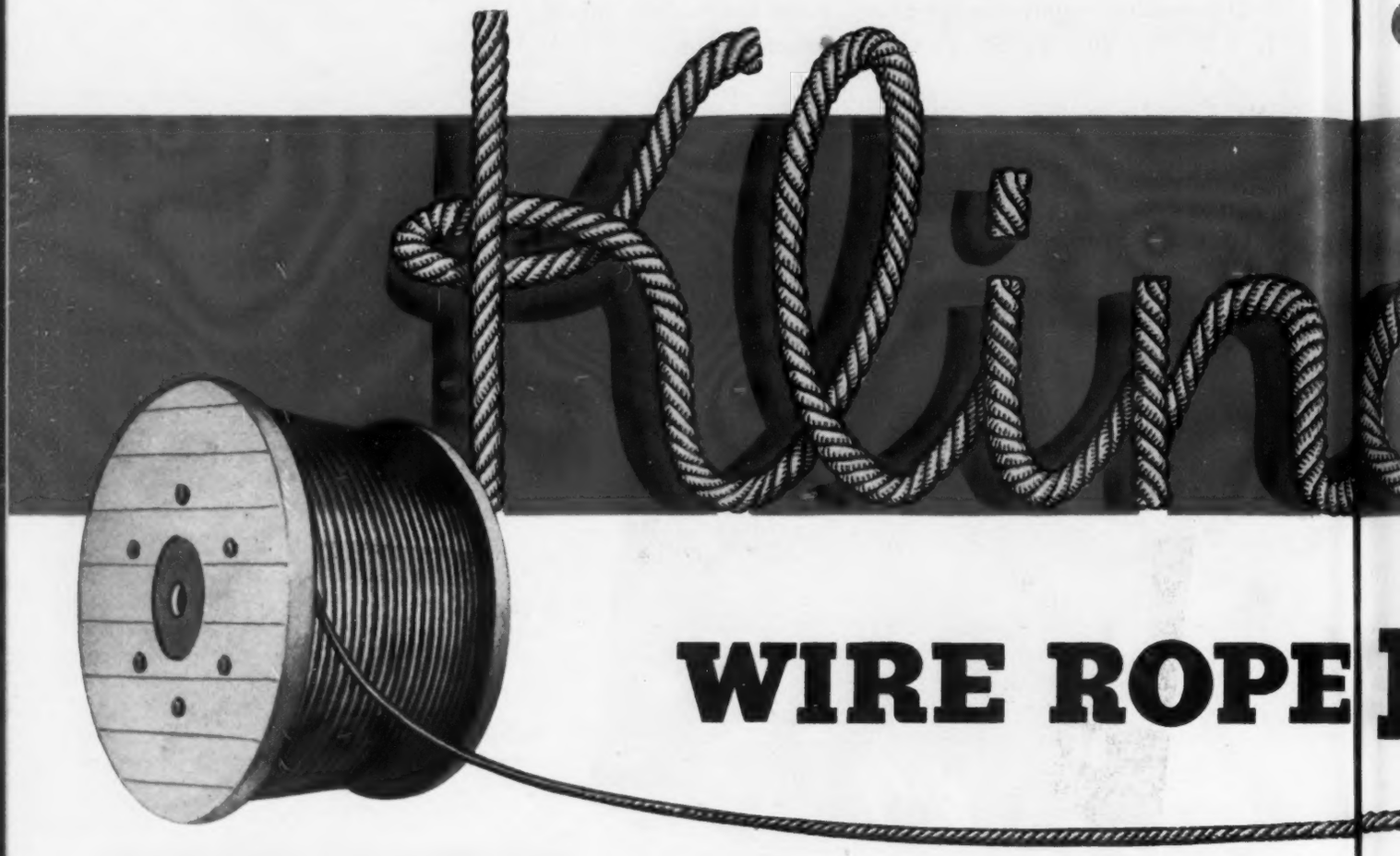


Fig. 1—(left) Operating cabs for locomotives nearing completion. Cabs are set on stilts so they can be worked on simultaneously from top, bottom and sides

Fig. 2—(below) 75-ft, 135,000-lb cab is being carried by gaint overhead crane to be lowered on articulated running grear



*LEADOLENE announces t



WIRE ROPE

WIRE ROPE MANUFACTURERS:

This brand new LEADOLENE "KLINGFAST" Wire Rope Lubricant is available in identification colors for your product. These colors are not a pigment paint, but *are actually the* KLINGFAST Wire Rope Lubricant. *This* gives you the opportunity to identify your product and at the same time provide the finest possible protection from manufacturing, through warehousing or storage—to "on the job." Write for technical information now!

* **LEADOLENE "I.P." LUBRICANT (INDESTRUCTIBLE pH-lim). The stability of LEADOLENE under most difficult operating conditions prove its amazing qualities.**

WIRE ROPE BUYERS:

You can specify LEADOLENE "KLINGFAST" Wire Rope Lubricant from many leading wire rope manufacturers. When the rope arrives on your job—we can furnish manufacturers' specifications of LEADOLENE Lubricants—so that you can have the continued protection of this fine lubricant. For the wire rope you are already using—by changing over to LEADOLENE Lubricants you may add many months of safer service life. Phone, wire or write for the name of the nearest Brooks engineer who can give you complete information about this revolutionary, new, corrosion-resistant wire rope lubricant.

DEPENDABLE INDUSTRIAL LUBRICANTS . .

es the Revolutionary New CORROSION-RESISTANT

E LUBRICANT

EXCLUSIVE FEATURES:

Indestructible pH-ilm strength—with amazing corrosion and abrasive-resistant qualities.

Adhesiveness—in which affinity for steel and other metals develops maximum adhesion and prevents drippage or creeping—*always retains flexibility.*

Water Repellent—creates an indestructible pH-ilm under the most difficult moisture or water conditions.

Corrosion-Resistant—provides an indestructible pH-ilm that will not etch or corrode metals—even where salt or sea water, acidic vapors and solutions are prevalent.

Abrasive Resistant—provides an indestructible pH-ilm that is repellent to adhesion of scale, metallics and other forms of dusts or contamination—highly impervious to lubricating oils and greases.

Temperature Factors—remains unaffected by temperatures as low as −40 degrees F.—it will successfully withstand temperatures much higher than other similar wire rope lubricants.

Users of LEADOLENE

Report Service Life

of Wire Rope

doubled and often more!

The Brooks Oil Co.

Pittsburgh 19, Pennsylvania
Cleveland, Ohio
Hamilton, Ontario

***Warehouses:* In Principal Industrial Cities**

. . . . . SINCE 1876

Tapping a heat of electric steel in a modern foundry

Economy in Electric Arc Furnace Operation

STEEL foundries have been far-sighted in matters of cost analysis and quality control, because of the willingness of the industry to adopt new, improved methods and because of the free interchange of information through the medium of national foundry organizations. In particular does this apply to electric furnace steel producers, since they have adopted electric melting in order to obtain a better product, and lowered costs.

Effective economy in the operation of arc furnaces must be based upon control, as well as knowledge of costs, to insure that an apparent saving on one item will not be secured at the expense of higher costs elsewhere.

Cheap refractories might, for example, allow rapid deterioration of metal parts of the furnace shell and require too-frequent patching; an old furnace with sluggish electrode motion and charged with heavy, dirty scrap may be a poor combination when heat-time and kwh consumption are considered, etc.

Since electrical quantities can be measured and controlled more accurately than most physical cost factors, improvements are most apparent in this direction, and will be dealt with here.

Nearly all electric steel foundries buy their power and therefore steps are taken to control power cost, such as staggered operation of furnace, observation of demand meter by melters, power factor improvement by synchronous motors, judicious use of lower taps of furnace transformer to prevent overheating of charge, etc.

Power cost in public utility rate schedules includes a number of factors, most of which are subject to considerable control by the consumer. For example, power generally may be obtained at a discount, if taken at 13,000 v or higher, which means that all transformations to lower voltages are made by the consumer's equipment. At times when money may be borrowed relatively cheaply, as at present, the purchase of stepdown transformers to obtain the primary power discount is a profitable investment of several per cent.

Of greater importance to the foundry is the control of the three power cost essentials:

1. Energy (kwh).
2. Maximum demand (kw or kva).
3. Power factor.

Of the total cost of electric power, the maximum demand charge has probably been the cause of the most controversy between the public utility and the consumer.

An unwillingness on the part of the

New automatic regulator controls kw maximum demand of electric arc furnaces by supervising movement of furnace electrodes. Employment of a new heat-proof circuit insures cooperation of melters and confines their responsibility to making good steel

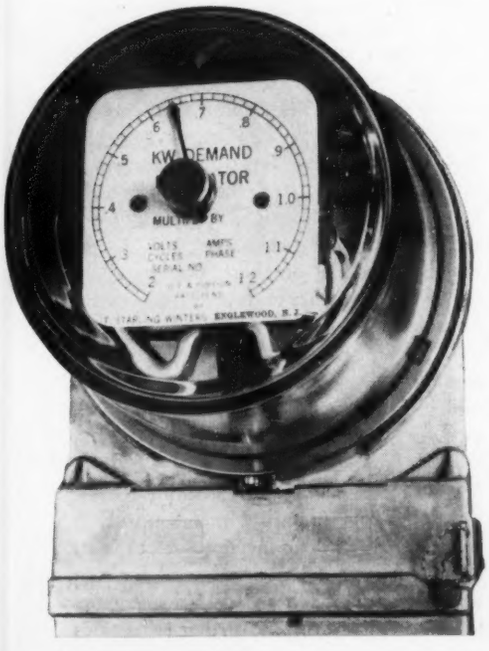
By T. STARLING WINTERS
Engineer
Englewood, N. J.

consumer to consider the justification of the demand charge, while he employs the most erratic kind of load—the electric arc furnace—and doubt that demand control can be effective without sacrifice of production, are causes of friction between consumer and seller of electric power. In this connection the utility itself may be paying a demand charge on wholesale power purchased from a second utility.

A few utilities do not measure, nor make a charge for demand, but compensate for this in a suitably-adjusted kwh schedule. This "hidden" demand charge of course makes the energy charge appear high.

The majority of utilities in the United States meter the power taken by an electric furnace foundry by means of the "block-interval" type of demand meter. The kwh is measured by counting the revolutions of a watt-element which rotates at a speed proportional to the kw load.

Load capacity of electrical apparatus is determined by the safe rise in temperature to which it may be subjected. Since a thermal effect always involves a consideration of the time factor, sudden rises in power load in excess of the rated capacity causes no distress, provided a compensating drop in load takes place shortly thereafter. Thus arises the need to consider the time-interval, or "block-interval," during which energy (kwh) is taken, in arriving at a value of maximum demand (kw), that will have meaning in terms of thermal load-carrying capacity of generators, transformers, reactors, etc.



Regulator for automatically controlling the kw demand of electric arc furnaces

Obviously, the shorter the "block-interval," the higher the maximum demand will be, since a short interval will frequently contain a peak portion of the varying load, even though the preceding or following intervals may contain low swings of the fluctuating load.

Demand meters are in use having "block-intervals" of 5, 10, 15, 30 and 60 min duration, although the majority of foundry loads are metered on either a 15 or 30 min basis.

A 15-min demand meter makes four determinations of demand per hour, or nearly 3000 determinations per month, the usual period between billings. Sometimes the single highest determination of the month sets the demand charge; other rate schedules may call for an average of the four highest in the month.

Since so few of the many demand determinations made actually set the power cost for the entire month, (often for the following 11 months) manual control of demand entails a great deal of attention at the furnace by the melter. This detracts from the melter's primary function of turning out good steel, and even then unavoidable demand excesses will occur.

Power Factor Considerations: Power factor is applied to the billing in several different ways. Some utilities measure the power factor of the foundry load at infrequent intervals with portable instruments and use the last-measured value as a divisor of the recorded maximum kw demand to obtain the "billing maximum demand."

More frequently, utilities measure reactive kva hours (kvarh) by means of an additional watthour meter, appropriately connected, and the average power factor for the month is then calculated by the relationship:

$$PF = \frac{\text{kwh}}{\sqrt{(\text{kwh})^2 + (\text{kvarh})^2}}$$

and the billing demand is $\frac{\text{kw demand}}{PF}$

Some few utilities measure kva demand directly. The type of demand meter required for this is more expensive than the kw demand meter, but results in a more accurate value of kva demand, definitely favoring the utility.

Most utilities have been slow to adopt kva demand meters for several reasons, as follows:

1. Higher first cost of the kva demand meter, for new consumers.
2. Heavy cost of replacement on a system-wide basis for old consumers.
3. Scarcity of all types of electrical equipment.
4. Fear of disturbance of customer relations.

Fear of disturbance of customer relations arises in two ways, first, since kva demand metering definitely favors the utility on a revenue basis, it might produce an unfavorable clamor for rate adjustments. Second, high kva demands are incurred in the meltdown portion of heats, owing to the frequent short circuits at the higher transformer voltage, corresponding to high tap operation. The arcs in the furnace constitute a 100 per cent power factor load, but in order to limit short circuit currents present practice is to employ considerable reactance in the furnace circuit, which is the reason why kva demand is so much higher than kv demand.

Most furnace transformers are provided with tapped reactors so that the total reactance in the circuit may be adjusted, (as size of furnace transformer considered goes higher, the per cent reactance provided is decreased, and transformers larger than 7500 kva are rarely furnished with additional reactors). For a given arc current, as reactance is increased, melting rate is reduced, power factor is depressed, and billing demand stays about the same. It is, therefore, to the advantage of the foundry to have the reactance as low as possible; at any rate, as low as is consistent with arc stability.

On the other hand, the utility must place some limit on the value of short circuit currents, for reasons of system stability and maintenance of satisfactory voltage conditions for other consumers on the same feeder. So the utility can not approve too low a reactance in the circuit, except under special conditions of use of "off-peak" power.

Thus it is seen that power factor improvement is worthwhile, and that it should be accomplished as much as possible at the source of low power factor first, i.e., by effecting the greatest possible reduction in reactance in the furnace circuit, before resorting to power factor "correction" by means of synchronous motors or static condensers.

Kwh Consumption: From a consideration of the latent heat of fusion, and specific heat of steel, we know that except for slight differences depending upon al-

loy content, a ton of steel can be melted for less than 200 kwh, provided none of the heat is lost to the furnace and other surroundings by conduction, radiation or convection. Actually, a great deal of heat is lost even in the most modern electric arc furnace of practical construction. More than half of the electrical energy supplied right at the arcs is unavoidably wasted. In addition, there are losses in the electrodes, electrode holders, mast arms, flexible leads, bus bars, transformer, and reactor.

In discussing kwh consumption, one must be specific as to where this quantity is measured. And throughout the industry there is an utter lack of uniformity, which gives rise to much data that cannot be used in making useful comparisons.

Practically every electric arc furnace control panel is equipped with a watthour meter, but some are connected to the primary side of the furnace transformer and others are connected to the secondary side. Of those installations where measurement is made on the secondary side, practically all take the voltage connections for the watthour meter from the bus bars ahead of the flexible leads, so that even this connection includes the electrical losses of electrodes, electrode holders, mast arms and flexible leads between the arcs and the bus bars.

As constructed at present, not much can be done to lower kwh costs at the furnace itself, except to keep time losses resulting from broken electrodes, slipping electrodes, cooling an overheated bath, etc. at a minimum. However, it is in the furnace transformer, reactor and control system that greatest possibilities for kwh reduction lie. Of considerable importance in this connection are the factors: 1. Sensitiveness and accuracy of the electrode control system and 2. speed of electrode motion.

To illustrate, the author observed operation of a fairly new 1200-kva arc furnace installation, which was considered by the operators to be performing satisfactorily.

Rated current of the transformer was 3650 amp and short circuit current was 6000 amp. At the start of the heat (high tap) the frequency of short circuits was 23 per min. Heat time with 3½-ton charge was 2 hours, 26 min. The kwh per ton was 560, measured on the secondary side of the transformer.

As the steel melted and dropped away from the arcs, power swings of as much as 150 kv at an input of 1200 kw were noted. These swings in power occurred without any arc extinctions and were taking place with a complete absence of any action on the part of the electrode winches.

It can be seen that both sensitivity and speed were lacking. A more sensitive electrode control and higher speed winch system would prevent such gross power fluctuations during arc play and would also act to prevent too-frequent extinctions of the arcs and the consequent time lost in lowering the electrodes to strike the arcs again. The loss in kwh (2.7 times the losses at rated current) in heating the transformer during short circuits, would accordingly be reduced, as would also the total heat-time. The value of 560 kwh per ton may not sound unreasonable, but this value did not include transformer losses, which were higher than need be.

Maximum Demand Control: Numerous foundries for the past five years have employed kw demand regulators for automatically controlling the demand of electric arc furnaces or entire plants in which the furnaces are used, by supervising the movement of the furnace electrodes. Operation is such as to also compel operation of the arcs at more efficient current values. This results in a reduction in kwh consumption, as a by-product of the primary result of regulation of demand at a desired rate.

Typical results obtained with regulators of this type in plants having considerably different values of kw load are as follows:

I. Steel Foundry, 300 kw

Two arc furnaces, average charge 6800 lb each.

Average heat-time: 2 hours, 15 min.

Annual saving in power cost: $6500 to $10,800, depending upon production schedule.

Total cost of regulator installation to date: $200 per year.

II. Steel Foundry, 1800 kw

One arc furnace, average charge, 7500 lb.

Average heat-time: 1 hour, 45 min.

Annual saving in demand charges only was $4800. In addition, a 5 per cent reduction in power billings for the year is earned under the terms of a special agreement with the utility, whereby the foundry agrees not to exceed the net demand for a 12-month period.

III. Steel Foundry, 600 kw

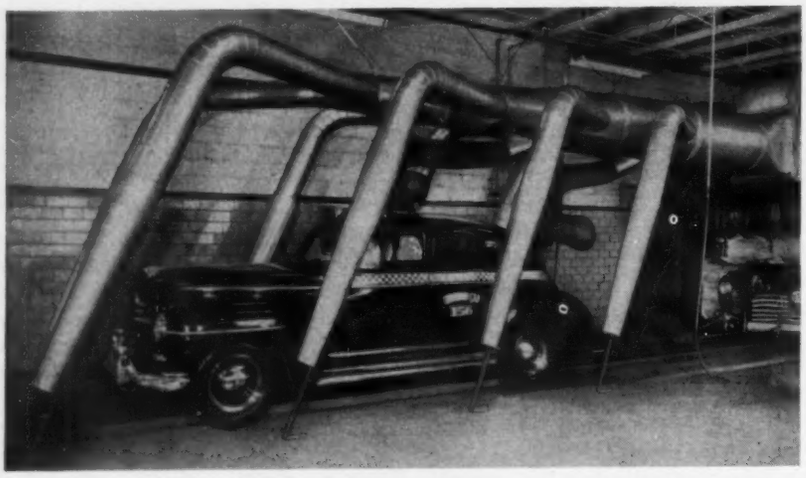
One arc furnace, average charge: 1400 lb.

Average heat-time: 48 min.

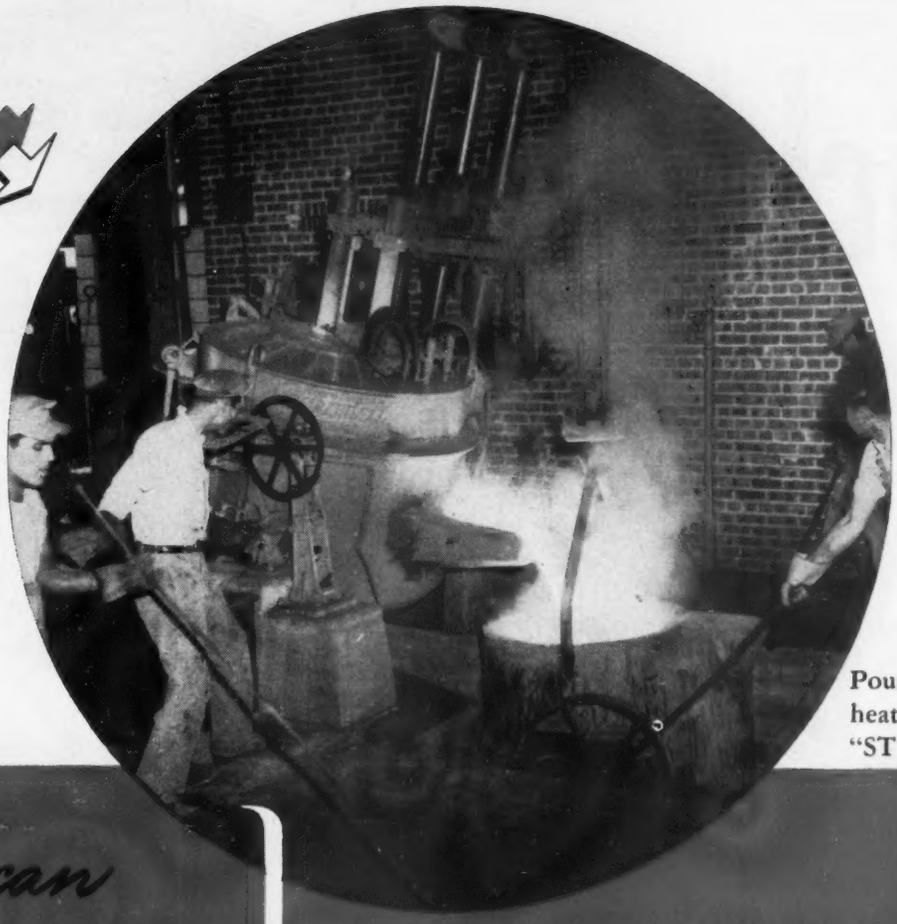
Annual saving in demand charges only: $2050.

In plants such as No. I, where production from month to month varies considerably, it has been found profitable to schedule the production a month in advance. When a dip from the average production is predicted, the regulator may be set lower, allowing a slight increase in heat-time or reduction in charge, whichever works out best, thereby cashing in on a further reduction in demand for the month.

In making a new regulator setting a demand setting on the conservative side, which, based upon the accumulated data of many units in service, will yield an annual saving of the order of $2.50 to $3.00 per kw maximum demand is recommended. The foundry management is encouraged to keep accurate records of charge, heat-time, demand, and kwh so that they will have the confidence from their own data to make further reductions



NO GIANT CLAW: Although resembling the fingers of a giant claw, this odd-appearing unit above, in reality is the drying end of a recently developed mechanical automobile washer. The "fingers" or air ducts direct a flow of air on the exterior surfaces of the car—after it emerges from the washing end—"lifting" or cutting the water from the surfaces at the same time car is dried. Washer end employs a series of brushes—on which water is sprayed—that revolve continuously, and are brought to bear against the front, sides and rear of the vehicle. A short endless belt on either side of the car serves to spin the wheels as brushes are brought into contact. Developed by Minit-Man Auto Wash Co., Detroit, the machine also may be used to wash panel delivery trucks and similar vehicles at the rate of 100 to 200 per day



Pouring a one ton heat from a size "ST" Lectromelt.

You can Service small orders better ...

with MOORE RAPID *Lectromelt* FURNACES

In a highly competitive market there will be a greater need than ever for service to customers in the matter of small orders to exact specifications, etc. In an effort to meet that need foundries and steel plants may well consider the Moore Rapid Lectromelt Furnace. Look, for instance, at these advantages —

Small heats to meet needs exactly and economically may be had by tapping part of a heat and altering the remainder to meet other specifications.

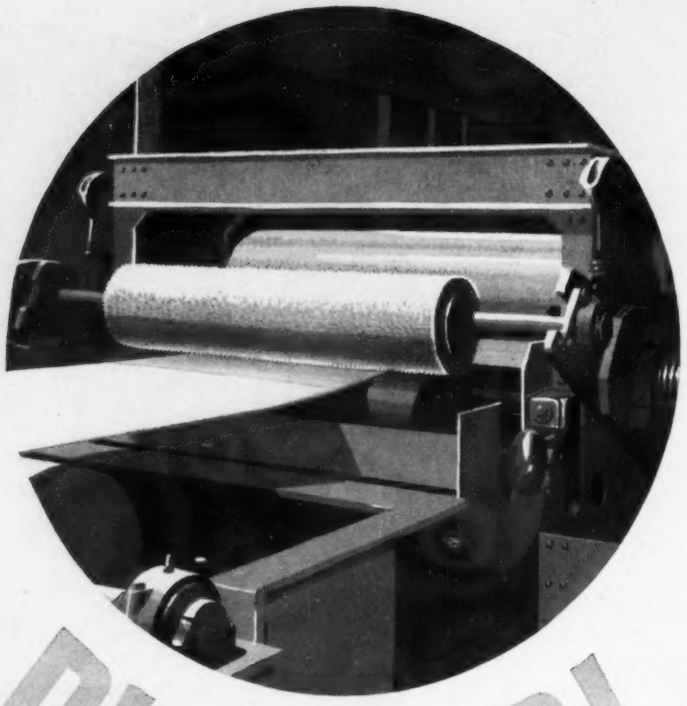
Additional economy is accomplished with the top charge type furnace through substantial savings in time between "power off" and "power on".

Top charge furnaces in sizes from 100 tons down to 250 pounds. Write for complete details on these Lectromelt features.

PITTSBURGH LECTROMELT FURNACE CORP.

PITTSBURGH 30, PA.

Pickled steel gets a PICK-UP!



● Stainless steel sheets pickled in nitric and sulphuric acid baths must be finished off with a hot water scrubbing. That calls for a tough brush . . . and Pittsburgh Brushes get the call from all important strip steel producers. ● Many brushes wilt quickly when contact is made with hot water-sprayed steel sheets, but Pittsburgh's dense fill of white tampico and Bahia fibre mixture, spiral wound and evenly trimed, stands up under the heaviest punishment. Fine stainless steel wire wound mandrels are also available.

Why the Pittsburgh Plate Glass Company Makes Brushes

As a leading manufacturer of paints, Pittsburgh found that a reliable source of quality brushes was necessary for the proper application of its products. For over 40 years, Pittsburgh has made its own paint brushes. It was a natural step to extend its engineering and manufacturing facilities by developing production, maintenance and power-driven brushes engineered to the specific needs of industry.

Back the All-American "Scrub Team" of Pittsburgh Brushes

● A Pittsburgh Brush does the job fast and gives you a uniformly finished product. You can depend on Pittsburgh Brushes for better performance, enduring economy, and a minimum of lost time in changeovers. In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and section assemblies, Uni-Fill scratch brushes, as well as paint and other maintenance brushes. ● Consult with the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing requirements.

PITTSBURGH
PLATE GLASS COMPANY *Brush Division*
3221 FREDERICK AVENUE · BALTIMORE—29 · MARYLAND

in demand setting, up to the limit at which lengthening of heat-time may be expected. This exploring for a lower demand setting that the initial one is important, because furnace installations of the same nominal capacity differ widely in electrical characteristics, owing to different per cent reactance values used, differences in speed and accuracy of electrode motion, sequence in operating transformer taps, etc.

Many utilities offer in their rate schedules "off-peak" power at substantially lower rates. And since the tendency has always been to overload arc furnaces even at the "on-peak" rate, many installations are drastically overloaded during the "off-peak" hours, with a consequent low efficiency of operation. The way to get the most out of "off-peak" power is to use a lower value of reactance during such hours. This will increase not only the power in the arcs, but power factor and efficiency as well, since arc current is not increased. For applications of this kind the regulator may be furnished with a double-demand accessory for controlling two entirely different values of demand during "on-peak" and "off-peak" operations.

The kw demand regulator has proved to be a good check on the accuracy of the billing demand meter. Most utilities maintain close standards of accuracy in their meters by careful, periodic recalibration, however, these meters get cut of adjustment occasionally when they are opened for changing charts. Utilities have been exceptionally co-operative with foundries using kw demand regulators, due in no small part to the performance of the instrument in improving customer relations.

—o—

Growth of the synthetic rubber industry in the last five years is the subject of a 50-page booklet released by United States Rubber Co., New York. Various types of synthetic rubber are identified and described in detail, and an impartial analysis of their properties is shown.

"Fluid Storage"

OF BAR STOCK

Portable racks and modern handling equipment increase flexibility of storage system

UNLOADING steel bars and strip, as well as storing them, and economical distribution to the factory in proper quantities have always been bothersome problems. At the plant of A. C. Gilbert Co., manufacturers of erector sets and electrical toys, unit loads of material are stored in the basement to eliminate worry about floor loads.

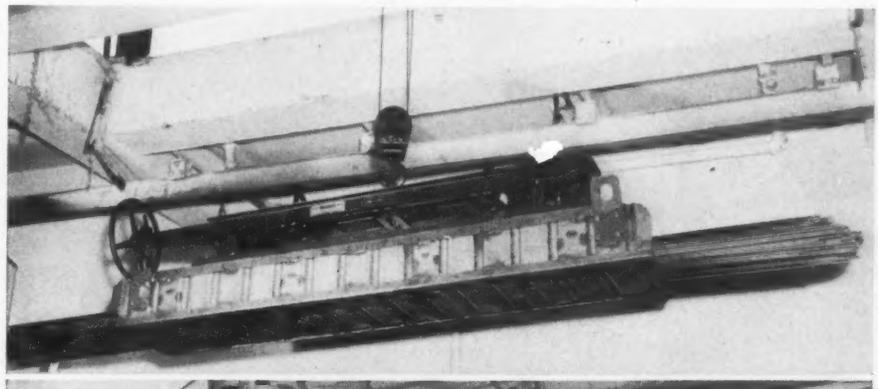
As the material is received from a motor truck it is placed in the container shown in Fig. 1. The entire load is then lowered through a hatchway onto a scale where it is weighed. From there, it is then picked up and moved by crane into the position shown in Fig. 2. Racks 8 ft long, 22 in. wide and approximately 8 in. high are interlocking so that they act not only as carrying units but as storage racks. This eliminates the long operation of transferring individual bars from a sling or container into fixed racks.

If a large load is to be sent to the plant for processing the entire rack is picked up. In view of the high speed of operation obtainable with this type of storage it is possible to pick up the top four or five racks to get at a bottom one and replace them in much less time than would be required for the removal of individual bars.

This method of storage does not necessarily imply the handling of a tremendous amount of material. For example, the company handles 3000-lb loads with the total incoming tonnage at 40 to 50 tons per month. Bars vary in length for 12 to 16 ft.

When it is desired to make mixed bundles, a rack is placed in position, the assorted bars are taken from the storage racks and placed in the container in which it can be sent to various points for distribution.

The A. C. Gilbert Co. uses a grab, manufactured by Mansaver Industries Inc., New Haven, Conn., designed with horizontally sliding legs with an angle iron on the bottom of each leg. The grab makes it easy to balance the load in the container as the material is being taken from the truck.



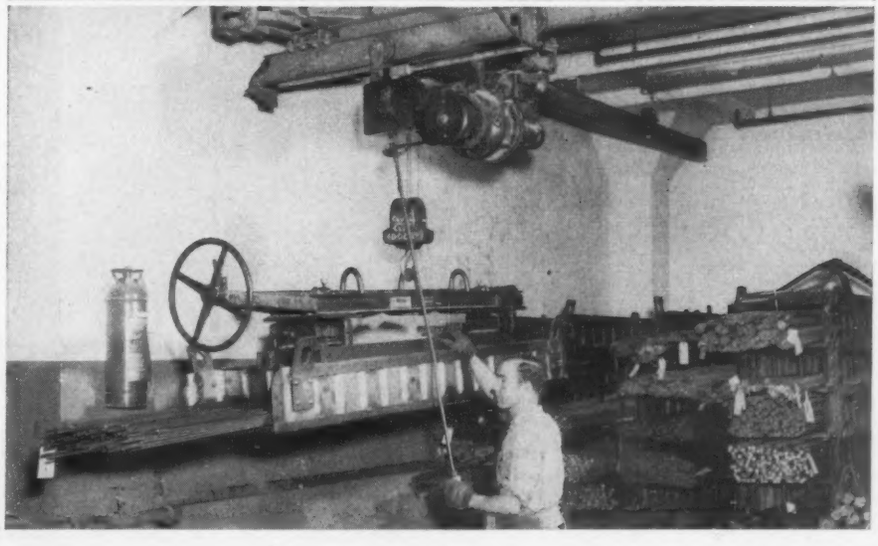


Fig. 1 (top) — As bar stock is received it is placed in container, lowered through hatchway and weighed

Fig. 2 (bottom) — Load is picked up and moved into storage position. Racks are interlocking so that they act not only as carrying units but as storage racks as well

Relocation of Plant Equipment

PAYS HIGH DIVIDENDS

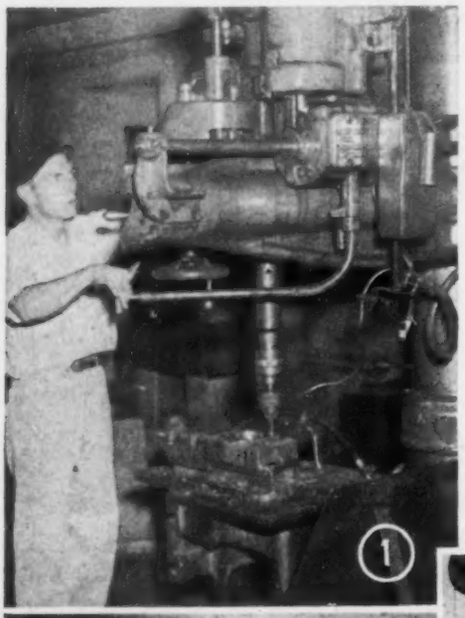
Production increased 300 per cent in Indiana plant by improving flow of production through proper placement of machinery, stock and tool rooms and other service areas

PRODUCTION of many plants often has been given a considerable boost by merely grouping similar pieces of equipment and service, and then locating these in accordance with their place in the sequence of production operations. Insley Mfg. Corp. of Indianapolis, when still heavily engaged in war work, made changes so valuable in plant layout and production methods that they were adopted for the present day production of their line of excavators and cranes.

Previously, this firm had some of its machines located in balconies that surround the main floor of the machine shop. At that time, the idea seemed to work out well because it removed some machine operations from the main shop floor. But when production had to be increased to meet the tremendous demands of the early forties, it soon became apparent that too much time was lost going from main floor to balconies. Thus all operations were transferred to the main floor. Inconvenience of the balconies was most apparent in handling materials to and from this area.

In eliminating the balconies, it was necessary to regroup the machines in the machine shop and structural shop. Turret lathes were consolidated in one group and single-spindle drill presses arranged in line. The layout was arranged to carry on straight-line production thereby facilitating movement of materials from the starting point to the finishing line. Even the Bullard or vertical mills and broaching machines were grouped together so work would move in a continuous line.

The tool crib, formerly located in the balcony on the supposition tools are not needed continually, was laid out in the



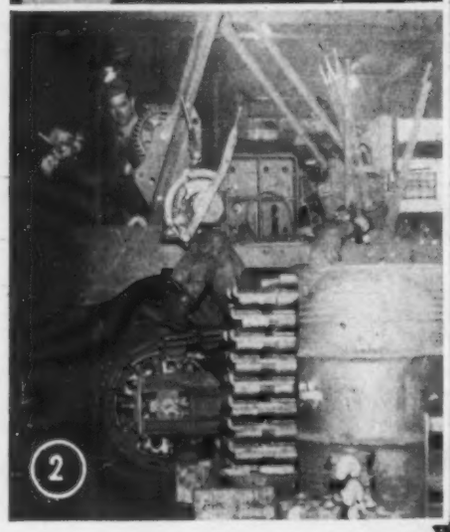


Fig. 1—Operator using a large radial drill is tapping a bearing which fits over a tumbler. Although this is a machining operation it is one of the very few such operations that are not done in the machine shop. The machine shop is located at the end of the building opposite the bucket and structural shops

Fig. 2—View of another assembly line showing one of the company's tractor units in the process of assembly

Fig. 3—One the cranes which is fabricated almost entirely of weldments

ITS FUTURE HUNG ON A THREAD

As the "horseless carriage" became part of the American scene, it brought a new demand for threading tools. Over 1000 makes of cars were on the road; machine shops mushroomed up over the countryside. But the automobile was only part of it . . . the country was on the threshold of a tremendous new mechanical age. And its future literally hung on a thread, for without fast and accurate threading tools, the miracles of modern precise machinery would have been impossible to attain.

GTD "Greenfield" played a vital role in this industrial revolution, developing threading tools of greater strength, speed and accuracy. Quick to recognize the superiority of GTD "Greenfield" products in those days, metal-working manufacturers have ever since looked to "Greenfield" for high quality in threading tools.

GTD "Greenfield's" development of improved designs in taps set new standards for cutting internal threads. First operated by hand with tap wrenches, these taps later were used in drill presses, high speed tapping machines and automatic screw machines to give greater speed and accuracy of production.

GTD Greenfield 75th YEAR

GREENFIELD TAP and DIE CORPORATION
Greenfield · Massachusetts

The GEOMETRIC TOOL COMPANY
New Haven, Connecticut · In its Fifty-Fourth Year
A DIVISION OF GREENFIELD TAP and DIE CORPORATION

Now! YOURS FOR BETTER PERFORMANCE!

Centrifugally Cast BUSHING STOCK

By Shenango-Penn

ASK FOR FREE BULLETIN No. 145

It contains additional data, including complete list of stock sizes, diameters and weights of Shenango-Penn machined centrifugally cast tubular bars and chill-cast solid bars . . . all available for immediate shipment.

IF you use bushing stock, why not get, at prevailing prices, the best that money can buy?

The same centrifugal casting techniques that make Shenango-Penn a preferred source of supply for long-lived, made-to-order bearings, bushings, sleeves, liners, rolls, etc., are now offered in Shenango-Penn tubular bushing stock!

Thus you gain many advantages: finer, pressure-dense grain, an 8 to 20% increase in tensile, finely divided and uniform lead dispersion, superior wear resistance, as much as 30% greater elongation, and *positive* relief from sand inclusions or blow holes. Here's bushing stock that's ready now to give you a big extra margin of safety, service-life and over-all economy.

Send for free descriptive bulletin No. 145 and the address of the Shenango-Penn sales office nearest you.

SHENANGO-PENN

SHENANGO-PENN MOLD COMPANY

468 West Third Street • Dover, Ohio

EXECUTIVE OFFICES • PITTSBURGH, PA.

ALL BRONZES • MONEL METAL • ALLOY IRONS

THEY SAVE A

Big "BUNDLE OF LETTUCE"

when vegetables are packed under VEEDER-ROOT "COUNTROL"

SHE NUDGES A KNOB AT HER ELBOW when she finishes packing a crate, and that's all she has to do to tally her work as she goes along. Her nudge is acknowledged by a flashing light which indicates that each case has been recorded on the totalizator (shown at lower right on the bank of counters). Slow, old-fashioned check and tally methods are thrown out. Work speeds up. An up-to-the-minute total of production is always visible. And employee relations are improved. That's Veeder-Root *Count*rol.

Standard or special Veeder-Root Counting Devices, built into products as standard original parts, open up limitless possibilities for those products in the way of new uses, new convenience to users, new economies in operation. Find out how *you* can make *your product* count its way to new markets and profits. Just drop a note to the "Counting House," and say when you want an engineer to call.

(Above) Panel of 20 Veeder-Root Small Reset Magnetic Counters. Totalizing counter at lower right. Light in lower center flashes on whenever one of the 20 packers pushes a button.

(At right) Veeder-Root Small Reset Magnetic Counter, Form U. S. for AC only. Height: 5 7/32".

The Counting House of Industry

VEEDER-ROOT INC.

Hartford 2, Connecticut

In Canada: Veeder-Root of Canada, Ltd., 955 St. James St., Montreal 3. *In England:* Veeder-Root Ltd., Dickinson Works, 20 Purley Way, Croydon, Surrey.

Fig. 4—Welding of concrete "buggies" as shown here, as well as drag buckets, French hoes, etc., is done in the bucket shop where only lighter gage material is handled

center of the shop where it would be easily accessible to all.

At one time, machine and jig repairmen and toolmakers were scattered all over the shop, in fact, they were located any place where there was a little space available. The balcony space released was set apart for these operations; the result of this centralization was greatly stepped-up production from the department.

Additional experience with welding during the war also resulted in substituting shortcuts for many joining operations so that at the present nearly all components are fabricated for welding. Final assembly also is accomplished almost entirely through welding. For instance, a crane boom is now welded with a saving of 110 lb in weight over its 30-ft length, and without loss of strength in the boom. Drag-line buckets, formerly requiring from 16 to 18 hours each to produce, are now welded and produced complete in 8 hours, at a 50 per cent lower production cost. Weight of the drag-line bucket in each instance remains the same, with no change in its performance. Fig. 4 shows the final welding of a concrete buggy.

Production now moves down an assembly line which runs the entire length of the building. Directly opposite the assembly line and running parallel to it is a welding line, also extending the entire length of the building. The assembly and welding lines are separated by an overhead crane. This is used to move units in process of assembly or in process of being welded. All large pieces are mounted on jigs to ease movement on rails laid between the assembly and welding lines. The welding line starts with the cutting of pieces to fit specifications and, from there, the cut pieces move in a straight line toward the other end of the welding line, with welding operations and subassembly operations taking place as the line is covered.

A Steelweld bender made by Cleveland Crane & Engineering Co. of Wickliffe, O., was recently added to the plant. It takes plates as thick as 1-in. producing a cold bend at a saving of fully 50 per cent in time and cost. Other heavy duty equipment includes the radial drill press shown in Fig. 1; an Ingersoll planer mill, the largest of its type in Indianapolis; as well as a Bullard vertical mill, likewise one of the largest machines of its kind in the city.

Units produced by this firm are finished by spray painting, the work being done in the open air, summer and winter. Drying is governed by the amount of drier in the paint, the quantity placed in the paint being varied by the manufacturer according to the season.

Another important change made by the firm is the segregation of service parts from assembly stock. Parts for service are housed in a separate building. About 10 per cent of the entire plant production goes to service, the remaining 90 per cent being tagged for production.

The changes made in this plant are far from startling, on the contrary, they are rather ordinary and scattered. The entire plant was not revamped completely, but it is interesting to note, in summary form, just what these few changes produced in the way of cheaper production and greater output.

Several years ago the firm had a monthly schedule of fifteen units per month. Today, the firm has a production schedule of 60 units for the same period which, in all likelihood in its turn will be exceeded in the near future.

In other words production is better than 300 per cent of prewar production. Only about 5 per cent in new equipment, chiefly machine tools, was added to achieve this increased production. The machine shop formerly worked on a one shift basis, today it is working on a two-shift schedule. About 60 per cent was added in manpower. The addition of workers and the addition of the machine tools are positive costs but balancing these two items of cost is the greatly increased production due mainly to the few changes in regrouping.

Fluid Punch

(*Concluded from Page* 91)

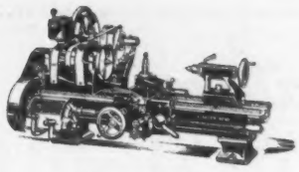
part shown. Parts illustrated in Fig. 3 indicate the variety of shapes which can be successfully formed with this process. Materials up to 3/16-in. thick have been worked. Some aluminum alloys in their full temper have been drawn into desired finished stampings, thereby eliminating the heat treating and necessary re-strike or straightening when heat treated after drawing.

Wire Drawing Machine Now Has Wide Speed Range

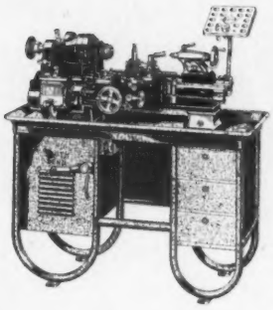
Giving a wide range of speed control to obtain maximum production of a given size of wire, a new Thy-mo-trol drive, the largest of its type built, has been installed as the main drive for a multipass wire drawing machine used to draw copper and brass wire at the Waterbury, Conn., plant of Scovill Mfg. Co. The control developed by General Electric Co., Schenectady, N. Y., uses sealed ignitron tubes for the armature power supply to operate a 40 hp, 230 v, adjustable speed motor.

The wire drawing machine has 16 dies, four drawing-roll spindles and a block for coiling the finishing wire. Wire is brought into the machine from a loose coil and, after passing through one die, it is given several turns around one step of the cone, and then passed through the next die to the opposite spindle. It passes back and forth between the spindles, each time passing through a die, and always passing to a roll having a larger diameter. In this manner elongation of the wire is taken up by higher speed steps.

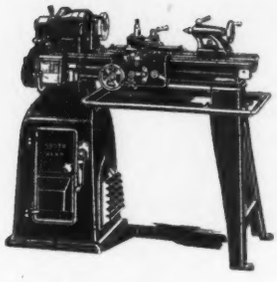
A speed range of from approximately 60 to 690 rpm is provided by means of armature-voltage control, and from 690 to 1380 rpm by means of field control. Adjustment of jogging speed from 60 to 690 rpm is attained by means of a separate control potentiometer. Constant speed is held for a particular speed setting, regardless of load.



9" Bench Lathe

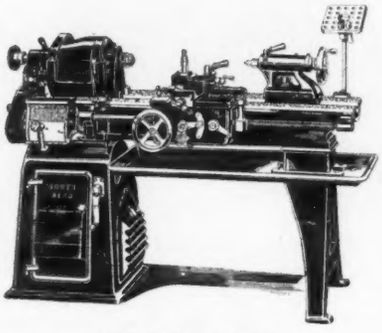


10" Bench Lathe

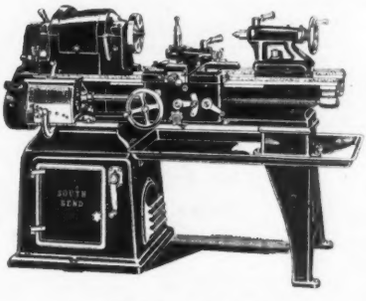


10" Engine Lathe

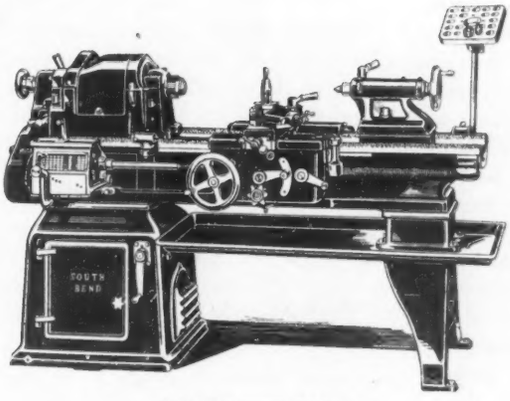
SOUTH BEND LATHES for accurate production operations and exacting toolroom work. Engine Lathes and Toolroom Lathes with 9", 10", 13", 14½", and 16" swings. Precision Turret Lathes with ½" and 1" collet capacities. Write for Catalog 100-F.



13" Toolroom Lathe



14½" Engine Lathe



16" Toolroom Lathe

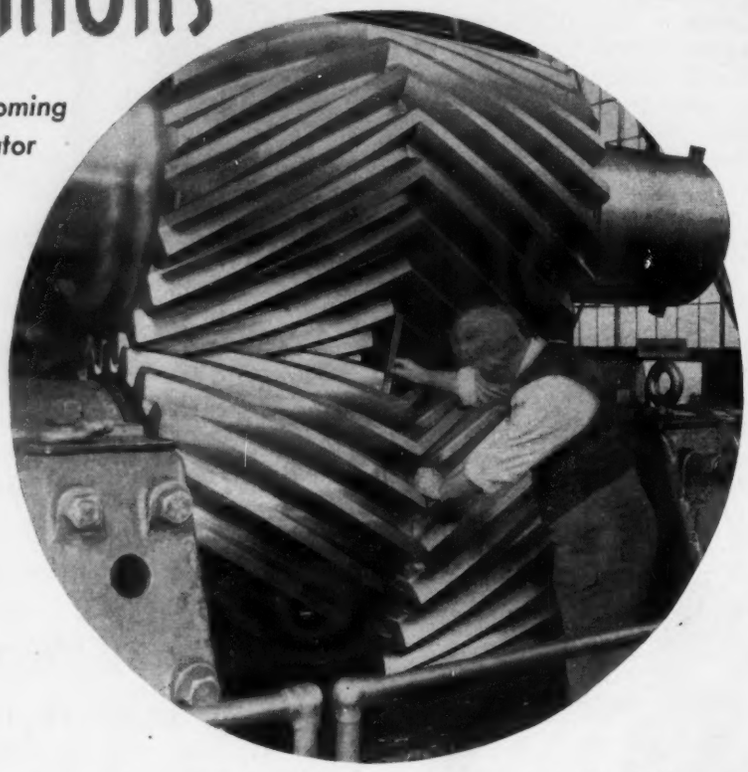
SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906 • 429 EAST MADISON STREET, SOUTH BEND 22, INDIANA

Generating 44-INCH PINIONS

Canadian firm cuts large pitch blooming mill gears on planer type generator

Magnitude of teeth and quality of surface finish are illustrated here



A SET of 44-in. blooming mill pinions with the following specifications —6.283-in. circular pitch, ½-in. diametral pitch, 22 teeth, 3.6-in. depth of tooth, 44-in. pitch diameter, 66-in. face, and 17 ft 20 in. overall length—was completed recently by Dominion Engineering Works Ltd., Montreal, Canada. According to the company, teeth on the gears have a larger pitch than any previously generated.

The gears were cut on a generator of the planer type, which was designed and built by Dominion for use in cutting continuous herringbone gears up to 20 ft in diameter, and 66 in. face width. It is different from most generators in that the cutters are oil hydraulic operated by two cylinders set at 120 degree included angle. The machine has fixed cutter block guides and cuts either 30-degree single helical or 30-degree continuous herringbone gears.

Each pinion took 280 hours to cut and represented a considerable saving over previous method of production. The machine itself was substantial enough to take at least ½-in. deep cuts but only ⅛-in. cuts were practical due to the relationship between cutter length and pinion face width.

The roughing cutters have three teeth each, but the finishers have only two. Considerable difficulty was experienced with cutter wear during the roughing operations; this was finally corrected by using cutters having inserted teeth made from No. 6 Leda steel.

Weld Inspection Methods Subject of Conference

Inspection of welds by Magnaflux is to be the subject of a conference to be held in Chicago, May 8 and 9. As stated by Magnaflux Corp., the sponsors' purpose is the exchange of information by those attending. Discussion leaders selected from the industry will conduct sessions devoted to specific phases and, according to the company, sufficient time will be provided to bring up additional topics from the floor. The company's Zyglo process also is on the agenda.

Program of the conference, to be held at the Congress Hotel, is as follows for May 8: 9:00 to 9:30, registration; 9:30, Magnaflux Fundamentals, C. E. Betz, vice president of sponsoring company; 11:15, Magnaflux Techniques, W. E. Thomas, manager of field engineering, Magnaflux Corp.; 2:15, Magnaflux in Relation to Other Weld Inspection Tests, John J. Chyle, director of welding research, and A. Cota, in charge of nondestructive testing, A. O. Smith Corp.; 3:30, Open Discussion of subject matter presented during the day, led by a panel of the day's speakers.

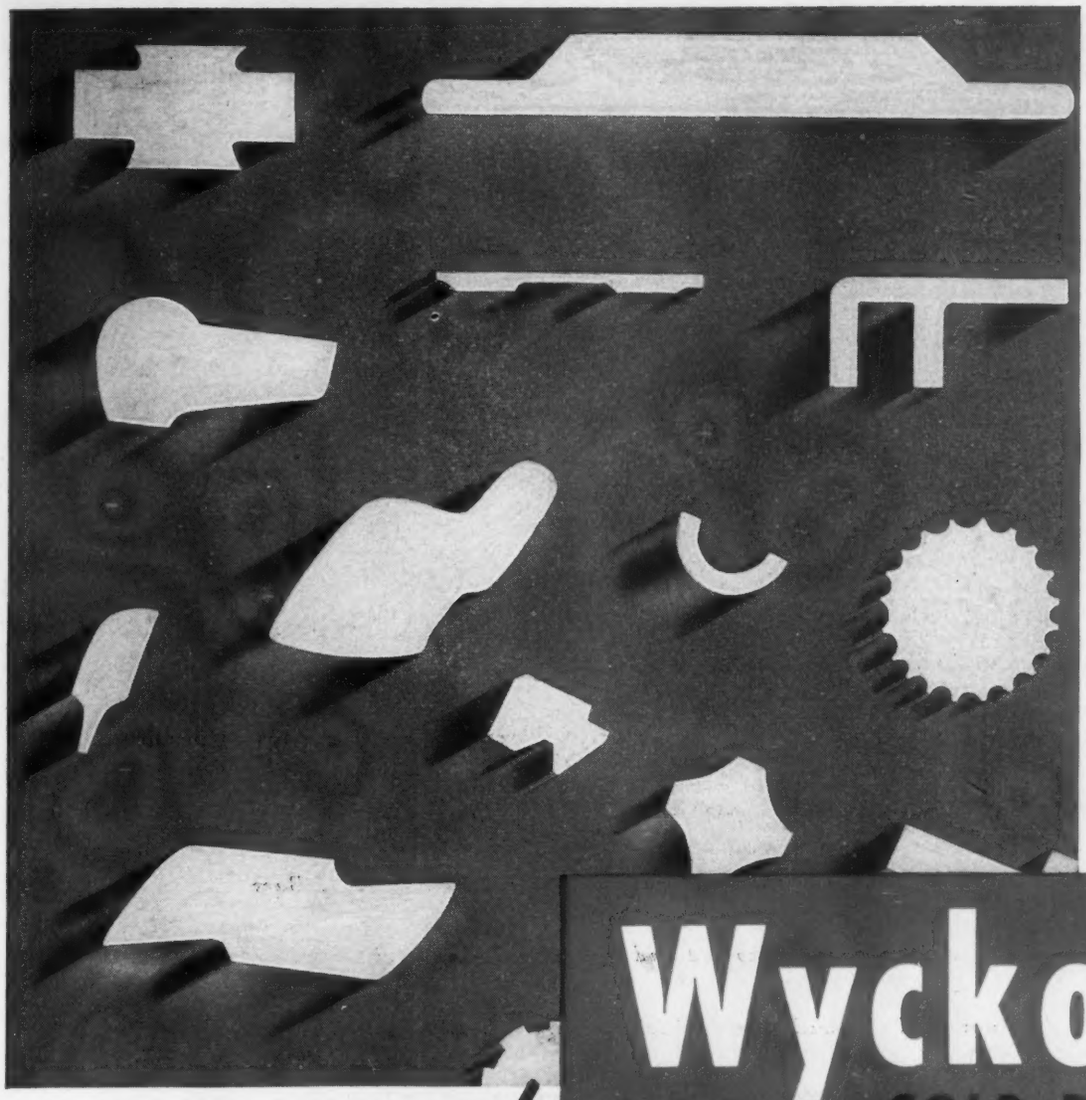
At 9:30 on Friday, May 9, an open forum discussion of Magnaflux problems in the following fields will be held: Machinery Weldments; discussion leader will be J. W. Owens, director of welding, Fairbanks, Morse & Co. Pressure Vessel Manufacture: Perry C. Arnold, chief inspector, Chicago Bridge & Iron Co. Field Inspection of Vessels and Tanks. leader to be announced. High Pressure Piping: W. B. Bunn Jr., welding engineer, M. W. Kellogg Co. Repair Welding: William E. McKenzie, principal welding engineer, U. S. Naval Gun Factory.

The afternoon program for that day includes: 2:15, general discussion with the same panel as the morning session; 3:30, Zyglo Principles and Application to Nonmagnetic Weld Inspection, by R. O. Schiebel Jr., manager midwest district, Magnaflux Corp. General discussion of application of Zyglo to the inspection of welds. On Saturday, May 10, demonstrations of equipment and methods will be conducted in the sponsoring company's plant.

Weld Positioning Brackets Patented

Two patents relating to fastener brackets designed for positioning, lining up and securing plates for welding, have been granted by U. S. Patent Office to Helen H. McLaren, Camden N. J. Patent No. 2,404,857 covers a bracket which includes two end plates connected by an intermediate plate angularly related with respect to the end plates. One end plate is adapted for spot welding to the work, the other has apertures to accommodate a drift pin.

In patent No. 2,399,053, the construction is simplified so that the two end plates or abutments co-ordinate with wide flanges so that they may be easily tack-welded.



Wyckoff

COLD DRAWN

SPECIAL SHAPES

half your work is done with...

For products that can be blanked . . . at least half of the machining operations you would otherwise perform in your *own* shop are done for you with WYCKOFF Cold Drawn Special Shapes. You get precision dimensions, form and finish at a fraction of the cost of machining. Your own fabrication is reduced to the minimum in time and cost. Consult WYCKOFF as to the economy of using Special Shapes for your specific cold finished products.

WYCKOFF STEEL COMPANY

First National Bank Building, Pittsburgh 30, Pa.
3200 S. Kedzie Avenue, Chicago 23, Illinois

Works at: Ambridge, Pa.; Chicago, Ill.; Putnam, Conn.; Newark, N. J.

Manufacturers of Carbon and Alloy Steels—Turned and Polished Shafting—Turned and Ground Shafting—Wide Flats up to 12" x 2"

For A Specialized Steel Service

STEEL

PROCESSED

to Industry's Requirements

Your steel can be Sheared . . . Slit . . . Edged quickly and economically at General Steel Warehouse. We process to your exacting specifications to pre-fit your steel for immediate production. *Inquire now.*

Cold Rolled Strip Steel • Coils and Straight Lengths • Cold Finished Bars

Shafting • Round Edged Strip Steel • Tempered and Annealed Spring Steel

Shim Steel • Round Wires • Feeler Gauge • Drill Rod • Steel Balls

HELPING ALL INDUSTRY TO REDUCE PRODUCTION COSTS...

GENERAL STEEL WAREHOUSE CO., INC.

1830 N. Kostner Avenue, Chicago 39, Illinois • Belmont 4266

CINCINNATI • MILWAUKEE • ST. LOUIS • MINNEAPOLIS • NEW YORK

Mechanized Soft Soldering

(*Concluded from Page 98*)

one idle, draw soft wire solder from a coil on a spindle and feed it through a copper tube to the seam being soldered. A funnel is provided for guiding the solder through the feed rollers. This assembly is mounted on a piece of steel plate welded to the edge of the mounting platform. The drive roller shaft is driven by a small gear which engages a larger gear attached to the CM-16 drive wheel.

As one of the steel boxes passes under brush, soldering acid is automatically applied to the seam. This unit can be seen in back of the coil of solder in the photographs. It consists of a machine oiler filled with soldering acid and connected by a copper tube to a small brush with a hollow metal handle. This gravity-feed system supplies the necessary amount of flux as the box moves along the conveyor belt and contacts the stationary brush.

The seams are heated and the solder is melted by an excess-acetylene flame from a welding blowpipe with a No. 9 head. The blowpipe is fastened to the mounting platform by a special clamp, as shown, so that the valves can be easily reached for adjusting the flame. This clamp is also used for adjusting the angle of the flame to the work. Both gases are turned on and off by a quick-acting double shutoff valve, making it unnecessary to disturb the flame adjustment when the blowpipe is turned off.

Before the machine is put in operation, the mounting platform is adjusted to the correct height for the size of boxes to be soldered. The blowpipe is then lighted and adjusted, the conveyor belt turned on, and the first box placed at the right-hand end of the belt. The box first passes under the fluxing brush, where the seam is coated with acid, as shown in Fig. 3. Then, just as the box reaches the blowpipe flame, the CM-16 motor is turned on, setting the solder-feed mechanism in operation.

As the box continues its travel, the prefluxed seam is heated, the automatically fed solder is melted, and the seam is completely soldered. Upon completion of the soldering operation, the box travels to the end of the conveyor belt while the solder solidifies. It is then returned to the beginning of the belt, turned over to the next seam, and the operation is repeated until all the seams are soldered.

—o—

End uses of steel are illustrated in a series of action type photographs in the 8-page newspaper published by Joseph T. Ryerson & Son Inc., Chicago. Printed by the rotogravure process, the paper, Ryerson Steel Pictorial No. 19, is available from any one of the company's plants.

3 and 1 Broaching

. . . on one dual-ram machine

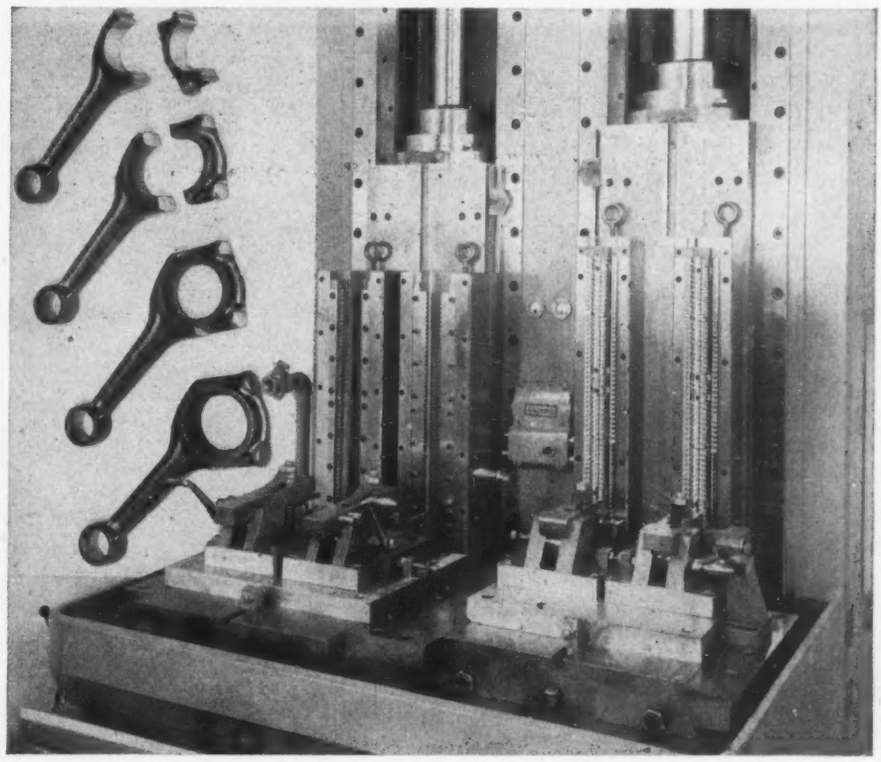
THREE separate broaching operations and one slitting operation were recently combined on a single Colonial Broach Co. 15-ton dual ram broaching machine with 66-in. stroke, to completely machine the big ends of automobile connecting rods. Operations required were: 1. Machining bolt bosses; 2. splitting cap from rod; 3. broaching parting faces and inside diameter of rod big end; 4. broaching parting faces and inside diameter of cap.

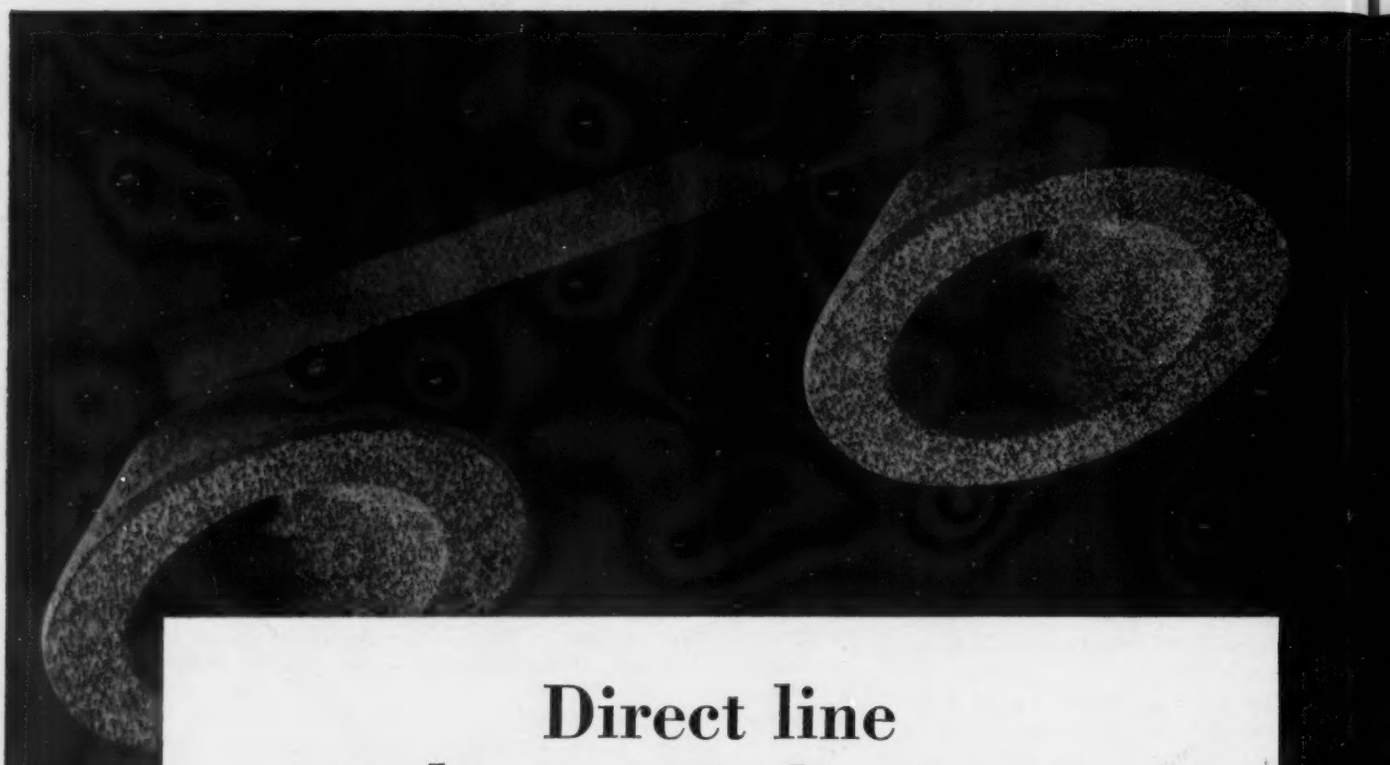
Manner in which these operations were worked out on the dual ram is illustrated by the parts shown in inset in the accompanying photograph. At the bottom is the connecting rod as it comes from the forging and cleaning operations, except that pin end has been broached and an oil hole drilled. Note that the big end bore is elongated to allow for the metal cut off in the slitting operation. Next to this is the rod as it looks after being broached on the first (farthest left) station on the dual ram shown in accompanying photo.

View second from top shows rod after it leaves second station. Slitting operation has been completed. Reason for splitting the slitting operation in this manner is to distribute metal removal evenly. If a single broaching operation were used for this, the broach would either have to be long—slowing up all operations and increasing machine size—or the step per tooth would have to be large, with resultant decrease in broach life.

The connecting rod now goes to the left station and the cap to the RH station of the right hand ram. Here, the bores as well as the parting faces are broached. The latter meet with a tongue and groove type of joint. This has the advantage of relieving the connecting rod bolts of side stresses and makes for a stronger connecting rod assembly. It is necessary of course to remove considerable metal from the parting faces in this operation, on both cap and rod, to machine tongue and groove. The connecting rod is now ready for drilling bolt and oil holes.

All broaches are built up from inserts, all of which are individually replaceable, thus keeping maintenance and replacement cost low. Since the machine operates on a continuous cycle, broaching and return speeds of the ram are identical, one ram broaching while the other is returning. Production is around 150 complete pieces per hour at 100 per cent efficiency. Fixtures are of the cam locking type, mounted on receding tables to facilitate loading during the return stroke of the ram.





Direct line to lower grinding costs

Are you interested in information that may cut your grinding expenses considerably?

Such information is available through a complete analysis of your grinding operations. This analysis may reveal something you have never suspected —that you are grinding away profits every day.

To remedy the situation, call in Peninsular engineers, specialists in grinding problems since 1889. They will study your grinding from start to finish. From this study, they will give you the answers that plug you in on the direct line to lower grinding costs.

Peninsular engineers have learned that each grinding job has special needs. That's why *every* Peninsular grinding wheel is specially made for its particular job.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

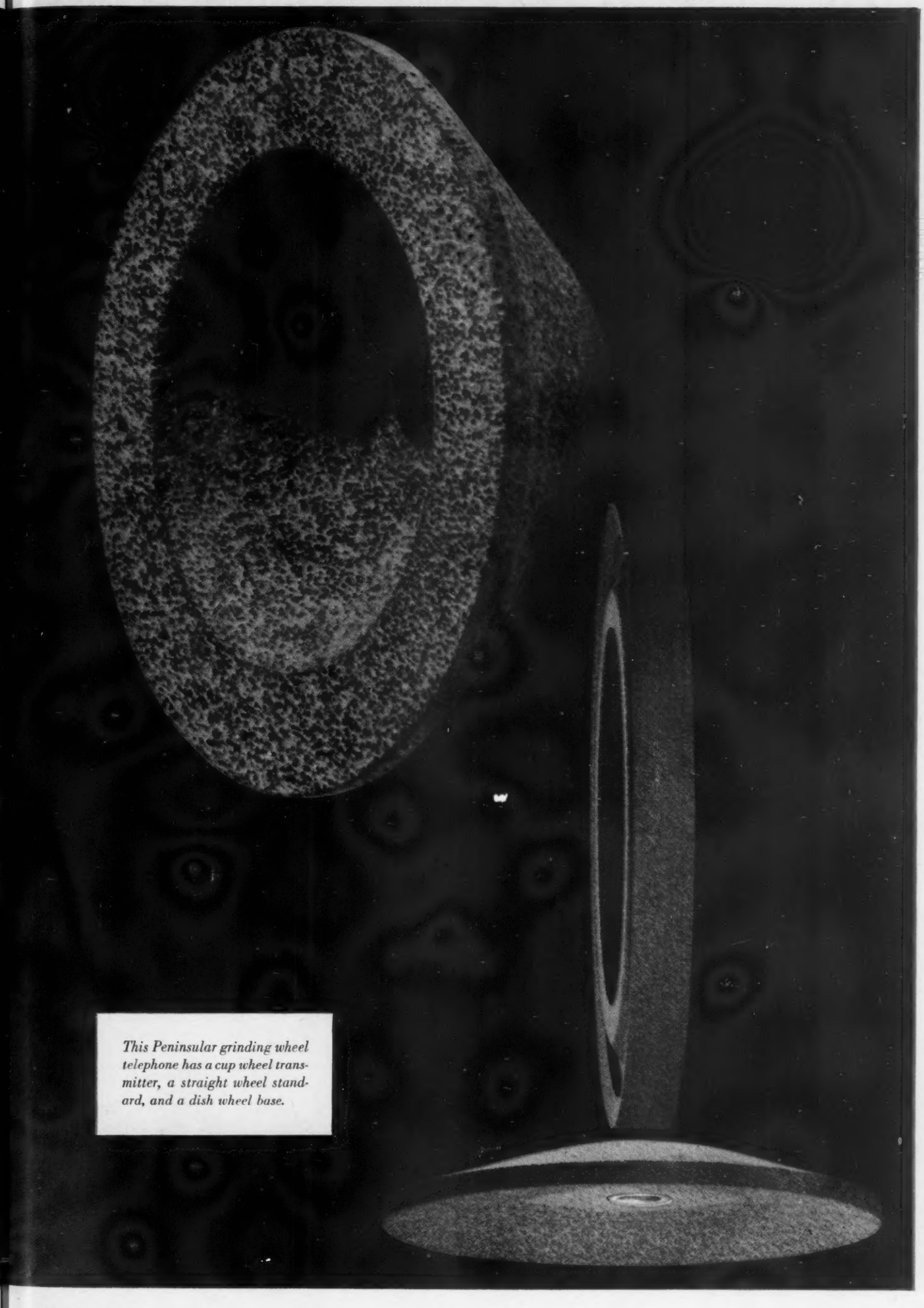
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS



This Peninsular grinding wheel telephone has a cup wheel transmitter, a straight wheel standard, and a dish wheel base.

Streamlining Standards

(*Concluded from Page 89*)

of information for the financial department to determine distributions.

There is a distinct difference between cost recording and cost control. The control of cost is the information furnished during the course of manufacturing for the purpose of correcting deviations from cost estimates or cost standards either by better tools, methods, engineering changes or sales prices. The recording of cost gives a value of the part or product after means of control are history. Tomorrow's responsibility of a cost department is one that instantly provides the necessary information to works management to measure productivity.

Greater effort should be made to standardize the variety of materials specified by engineers during the course of development without sacrificing the utility, cost and quality of the product. Engineering development to functional requirements should be separated from product designing. Tomorrow's products must be designed to the requirement of simplified methods of manufacturing and to the use of improved manufacturing processes and tools adaptable to high productive equipment. The effective use of manpower and productive equipment must be translated into the design of the product.

Sales Analysis and Productivity: Without sales there is no enterprise. Without a sales analysis, standardization of engineering becomes more complicated, manufacturing inventories hazardous and the effective use of manpower and manufacturing methods impractical.

Sales requirements and engineering developments must be co-ordinated in such a way that they provide a sound basis for manufacturing planning. Material requirements and manufacturing schedules are developed from sales forecasts. Manufacturing planning and the effective use of an organization cannot exceed the efficiency of a sales forecast.

To increase production and lower manufacturing costs, the functions of sales, engineering and manufacturing must be correlated and controlled by top management, with the objectives of keeping inventories at a minimum and production efficiency at a maximum. Many companies have sales statisticians and industrial planning engineers who are providing top management with essential information pertaining to sales, profit expectancies and financial requirements of the business for the next 5 years or so.

Manufacturing requirements developed by sales statisticians are carefully analyzed by industrial planning engineers. Factors of cost, inventories and expenses are studied by industrial experts, prior to release for manufacturing. Improvements in engineering designs, means of cost reductions and waste saving devices are analyzed by this planning group.

New Enterprise: Many new industries started in recent years and operating according to those fundamentals are in a more fortunate and competitive position. Others contemplating starting a new manufacturing business can, with little difficulty, institute the requirements by observing the basic principles, even though, in the beginning, several functions are performed by one person.

Competition will force others to apply streamlined methods or eventually lose their sales outlets to those in a position to produce and sell at a lower cost. Many industries are segregating the type of products for the purpose of decentralizing their operations, since the change-over from an established and deep-rooted policy is difficult to accomplish if reconversion programs are instituted within an organization.

Not long ago, two young men started a business and discussed their objectives with me. The nature of the work consists of servicing technical equipment, engineering development work, sales and maintenance of technical equipment. It is of interest to note that these men realized the necessity of setting up a functional work flow and authoritative organizational chart even though no other employee except a secretary appeared on the payroll.

In preparing the flow chart, the future planning and objectives were given careful consideration; the nature and principles of the work described and correlated. This information was used for assigning final authority between the two men, in accordance with their capabilities and experience. These men realize that when the business expands and other employees are added to the organization their duties and functions must be clearly defined at time of employment, so that they too will assume the responsibilities and authorities in accordance with company objectives.

Engineering standards were set for the work they expect to do. These standards consist of materials confined to a minimum of varieties and shapes; drill sizes, reamers, taps, thread gages, bolts, screws and other parts which are generally used, are analyzed carefully and incorporated in their engineering standard books as preventive measures against unnecessary inventory investments.

Today, these men are surveying sales potentials and the application of the product they expect to sell and service so they can effectively plan their engineering development program.

From address before the Oklahoma Industrial Conference, Tulsa, Oklahoma, Oct. 29, 1946.

—o—

Resistance of Vinylite plastics and adhesion, depth, gloss and workability of synthetics are combined in the new series of high solids finishes manufactured by Watson-Standard Co., Pittsburgh. Finishes, both in clear and brilliant colors, are prescription compounded and may be applied with any method of metal product finishing either before or after fabrication, the company states.

NEW LITERATURE

HYDRAULIC PALLET LIFT TRUCK
By Lyon-Raymond Corp., 3156 Madison street, Greene, N. Y. Bulletin with photographic illustrations showing method of operation with pallets, recommended pallet construction and adaptability of various materials to palletizing.

INDUSTRIAL TRUCKS
By Electric Industrial Truck Association, 208 South La Salle street, Chicago 4. Summary of how industrial trucks have advanced mechanized materials handling in the past decade and how they are used in industry today.

POWER UNIT
By Radio Condenser Co., Camden, N. J. Four-page, two color bulletin describes the R/C Rotonoid, giving details of construction, possible variables and a list of suggested applications in which this unit might be used.

BC AUTOMATIC CONTROLS
By General Controls Co., 801 Allen avenue, Glendale, Calif. A 52-page catalog illustrating the company's complete line of automatic pressure, temperature and flow controls for gas, oil, air, water, steam, refrigerants and other fluids for domestic and industrial use.

PAINT PROGRESS
By New Jersey Zinc Co., 160 Front street, New York 7. Booklet discusses what is new in paint, how it can be used more effectively and how various ingredients in paint affect its properties.

AIR RECOVERY PANELS
By W. B. Connor Engineering Corp., 114 East 32nd street, New York 16. Bulletin 106-A contains complete data on design, construction, function and application of Dorex activated carbon air recovery panels.

CHUCKS
By Westcott Chuck Co., Oneida, N. Y. Catalog No. 700 describes company's line of chucks and includes the consumer price list giving prices for all chucks in the catalog as well as prices of renewal parts.

LIGHT BULBS
By Lustra Corp. of America, 40 West 25th street, New York 10. Four-page illustrated bulletin describing four types of light bulbs designed for service where ordinary light bulbs fail.

MULTI-PURPOSE Wheelabrator Swing Table

Replaces the Airblast Room —handles at least 80% of this class of work.

Handles wide range of work—for shops desiring a versatile machine.

Hygienic—the operator works outside the cabinet.

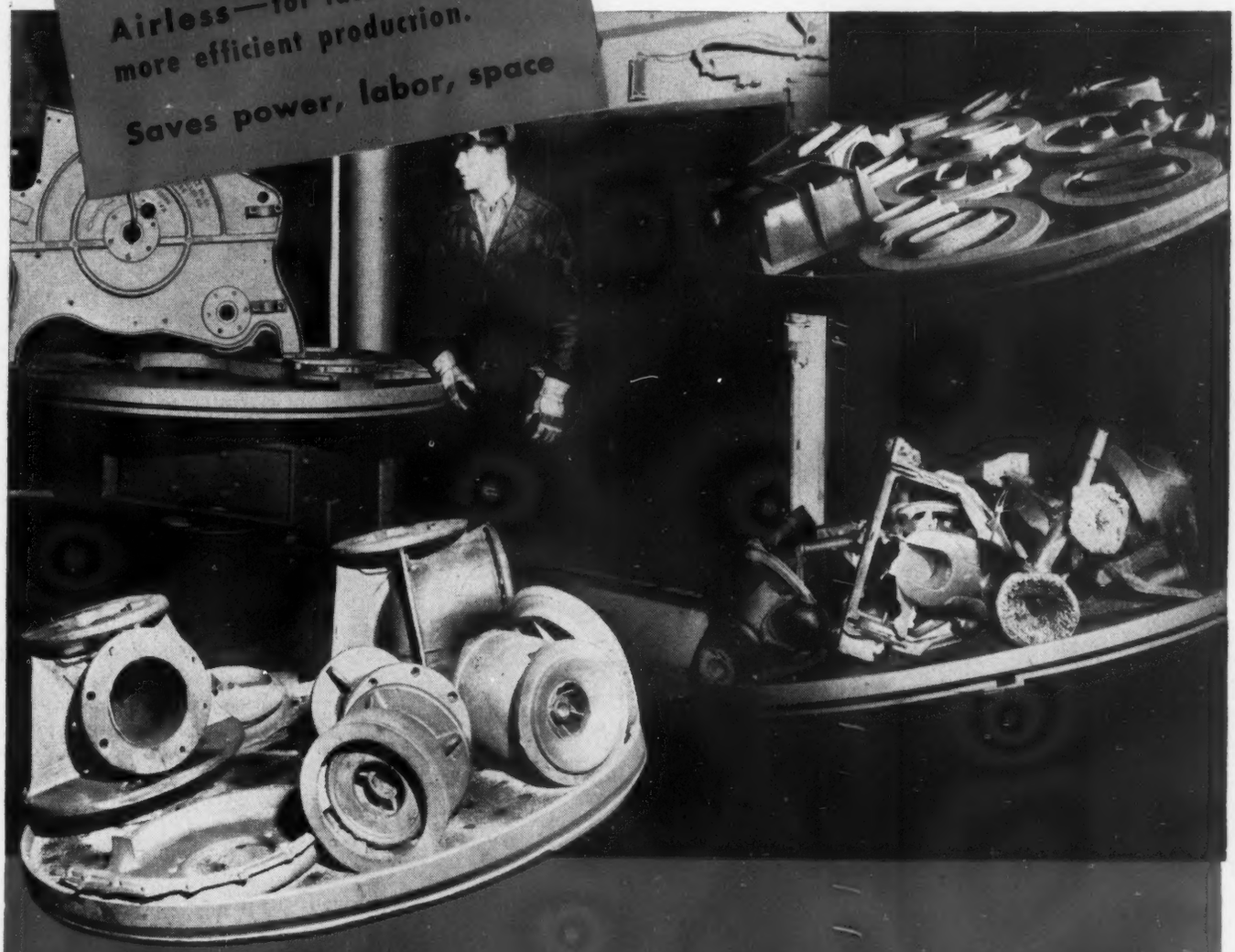
Airless—for faster, cheaper, more efficient production.

Saves power, labor, space

This machine disposes of the slow, high cost, unhygienic disadvantages inherent in Airblast Room operation. Equally important is the fact that the machine serves admirably as a versatile, general purpose unit for the shop requiring a single moderately-priced equipment capable of handling work of a wide variety of shapes, sizes, and weights.

Opening the door of the machine brings the work table into position for loading or unloading. Closing the door brings the rotating table beneath one or more airless Wheelabrator blast units.

By combining Wheelabrator speed cleaning with the versatility of the Swing Table we have developed a moderately priced machine of broad usefulness that meets present day requirements for speed and economy of production.



Swing Table Catalog 214-A now available. Graphically describes 8 sizes, speed, economy, and diversity. Write for free copy today!

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
509 S. Byrkit St., Mishawaka, Indiana

Carburization of Steel

(*Continued from Page 96*)

because it is eliminated on cooling; it is conceivable that quenching might retain some hydrogen.

Amount of foreign elements that can be absorbed by iron depends on the solubility limit. At a given temperature the iron will dissolve interstitially only a certain amount of carbon; this solubility increases with increasing temperature. In the iron-carbon diagram, Fig. 11, the A_{cm} line gives the limit of solid solubility of the carbon at any temperature. At 900° C the iron can dissolve up to 1.2 per cent carbon and at 1130° up to 1.7 per cent.

Since absorption is a surface phenomenon, the condition of the surface is important. Any interference with the surface forces by copper plating, refractory coatings, and soot will affect the gas-metal reaction and will retard or stop carburization as well as decarburization. The use of copper plating is often a common means of localizing carburization.

Diffusion of Absorbed Carbon

After the reaction between the gas and the metal, carbon is dissolved atomically on the metal surface. Because of the difference in carbon concentration a gradient is set up which will cause the diffusion of carbon into the metal. (This diffusion of carbon can be treated mathematically by Fick's law but space limitations prevent the inclusion of the necessary explanatory material which must accompany such treatment.)

The product one seeks is one with a hard wear-resistant or fatigue-resistant case on a relatively tough and shock-resistant core. After the material is carburized to get the proper case depth, it must be heat treated so that the optimum property of the case can be realized. The heat treatment of the carburized steel is quite variable depending on the nature of the steel, the use for which it is intended, the economics of the materials and treatments, and individual preferences. The nature of the heat treater's problem may be mentioned briefly.

A carburized piece is regarded as a duplex material, i.e., a high carbon surface and a low carbon core with a gradual transition from one to the other. This situation complicates the heat treatment because the transformation range of the two regions is different.

Fig. 4 shows schematically the numerous heat treatments which can be given to the carburized materials, depending on whether we wish specifically to treat the case, the core or both[15].

Decarburization

As previously pointed out decarburization is in general undesirable. There are instances, however, where decarburization is definitely sought. In order that a better understanding be achieved some decarburization reactions and the kinetics of the process should be discussed.

Decarburizing can be considered as comprising three parts:

(1) A decarburizing atmosphere which will remove carbon from the metal.
(2) The gas-metal reaction.
(3) Diffusion of carbon from the interior.

In the discussion of carburization, it has been demonstrated that two fundamental equations can cause carburization if the given reactions proceed from left to right in Fig. 2 for the carbon monoxide equilibrium and Fig. 9 for the methane equilibrium can be used to see how decarburizing a given gas mixture can be. For example, a 1 per cent carbon steel at 950° C in a carbon monoxide—carbon dioxide mixture would decarburize in any mixture containing more than 1.8 per cent carbon monoxide, or in a methane-hydrogen mixture it would decarburize in any mixture containing more than 97.3 per cent hydrogen.

Decarburization can also occur by other reactions. Oxygen and moisture can and do cause decarburization. Oxygen is a severe decarburizer, not only oxidizing the carbon in the steel but the iron as well. The reaction may be considered.

$$^{C}(\text{in Fe}) + O_2 \rightleftharpoons CO + FeO \quad \ldots(12)$$

Commercial nitrogen which is sometimes considered a neutral atmosphere is a good decarburizer if the oxygen content is above 0.1 per cent.

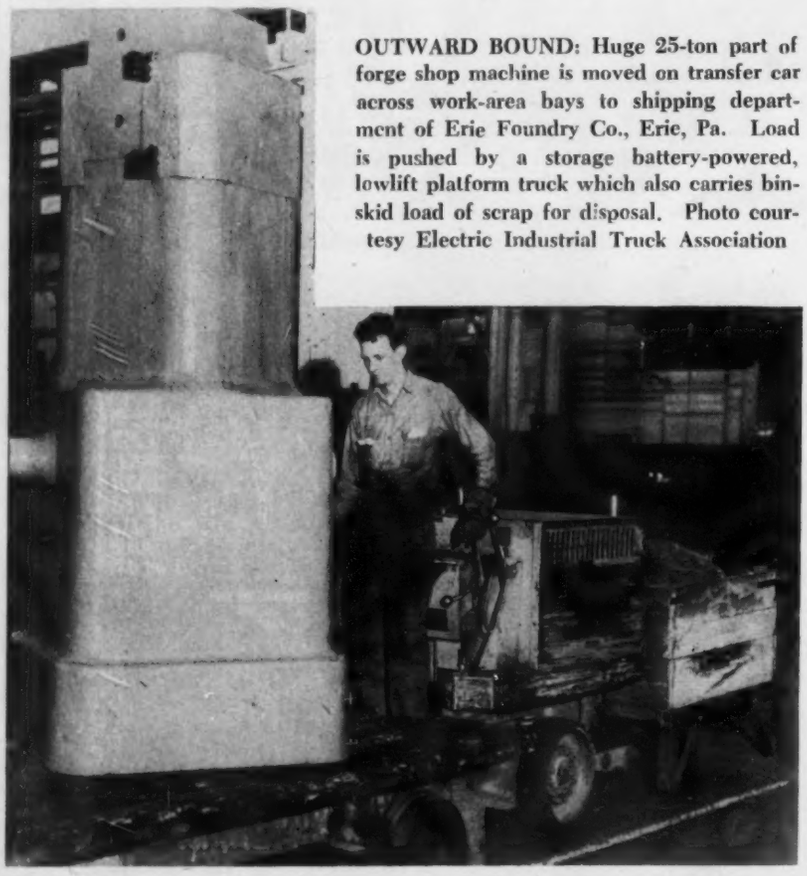
Moisture is a very good decarburizer. Dry hydrogen is a poor decarburizer compared to wet hydrogen which is a very good one. Dry hydrogen can decarburize by forming methane; wet hydrogen can decarburize by forming carbon monoxide. The moisture reaction can be written:

$$^{C}(\text{in Fe}) + H_2O \rightleftharpoons CO + H_2 + Fe \quad \ldots(13)$$

In the case of wet hydrogen, the hydrogen acts as a carrier for the moisture which is the major decarburizing agent. Nitrogen, which has been freed of oxygen, but which is saturated with moisture is just as effective a decarburizer as wet hydrogen.

Metal Interface Reactions

A reaction of a carbon-deficient medium at the metal interface must, of course, exist, but there is no detailed information as to what exactly occurs. It is well known, of course, that carbon is removed at the immediate surface at a rate which will depend upon the nature of the decarburizing agent and the tem-



OUTWARD BOUND: Huge 25-ton part of forge shop machine is moved on transfer car across work-area bays to shipping department of Erie Foundry Co., Erie, Pa. Load is pushed by a storage battery-powered, lowlift platform truck which also carries bin-skid load of scrap for disposal. Photo courtesy Electric Industrial Truck Association

Electro

HIGH-SPEED SNAGGING

Electro HIGH SPEED Snagging Wheels reduce this ordinarily time-consuming, preparatory job to no more than an incidental interruption of truly productive operations. They bite brutally. They resist pressures and defy shocks. Operators confidently "sock the loads to 'em" whether working on bars, billets, forgings or castings of stainless steel or soft brass. We'll gladly give you job-side engineering co-operation.

•

ELECTRO REFRACTORIES & ALLOYS CORPORATION

MFRS. • REFRACTORIES • CEMENTS • CRUCIBLES
GRINDING WHEELS

344 DELAWARE AVE. • BUFFALO 2, N. Y.

West Coast Warehouse—Los Angeles

•

Our new grinding wheel manual is the most talked-of catalog in industry. Gives technical details from basic abrasives to special purpose wheels. Illustrated in *full color!* Send for your free copy right now!

Electro HIGH SPEED GRINDING WHEELS

Electro SINCE 1910

TRANSFORMERS MARCH: Doing a column half right as they come off the production line at Westinghouse Electric Corp.'s Transformer Div., Sharon, Pa., these modern pole transformers parade in double file along the roller conveyor line from the testing area to the shipping department. Transformers on line at left are for city power lines, while those at right are used mainly on rural lines

perature of the reaction.

The rate of removal of carbon from the surface layer can be written,

$$V = \frac{dC}{dt} = kC \quad \ldots\ldots\ldots\ldots (14)$$

for any given atmosphere at a given temperature. This is a first order reaction and integrates to

$$C = C_s e^{-kt}$$

where k is the rate constant

C is carbon content at any time t

C_s is carbon content on surface

This is a first order chemical reaction. Fig. 10, a log carbon vs. temperature plot, shows the decarburization of iron turnings in dry hydrogen. This type of reaction also occurs on the surface of a large section.

As soon as the surface is impoverished by the removal of carbon by the gas carbon starts to migrate from the interior to the surface. The situation which exists when the surface carbon is at various concentrations at increasing times, t_1, t_2, t_3 and t_4 is shown schematically in Fig. 6. The effect of temperature on the decarburization curves is shown in Fig. 3 for CO_2. If the time is known when the surface carbon is zero it is possible to calculate a decarburization curve by employing Fick's law.

Conclusions

Within the last few years the metallurgist has rationalized certain phenomena of carburization and decarburization to such extent that they can be reduced to calculation. In the discussion presented here some of the methods of attack and the results have been demonstrated. The success of the present attack does not imply that all ramifications of carburizing or decarburizing are or can be explained at the moment. For example, nothing has been said about carburization or decarburization in highly alloyed steels particularly those containing strong carbide formers or in ferritic materials such as those containing high silicon or aluminum (concentrations beyond where the gamma loop is closed); nothing has been said about the carburization or decarburization below the A_3 point.

For successful gas carburization one must have an atmosphere which can deposit carbon on the work. At the reaction interface there must exist chemisorption and sufficient solubility for the carbon obtained from the atmosphere. Once the carbon has been absorbed on the surface it starts to migrate into the metal by diffusion. When sufficient carbon has diffused and a case has been formed the part is heat treated to give the desired properties.

In general, decarburization of steels is avoided. In situations where decarburization is deliberately sought, the phenomenon can be said to be treated as follows: An atmosphere must exist which will remove carbon from the steel. As the carbon is removed from the surface, carbon in the interior starts to diffuse to the surface.

REFERENCES

1. Roberts, W. C.—Austen, Jnl. Iron & Steel Inst. 1896, 1, 139.
2. U. S. Patent 2,287,467.
3. T. D. Yensen, A.I.E.E. 1924, 43, 145. See also article on Soft Magnetic Materials, Metals Handbook 1939, p. 490.
4. Low and Gensamer, A.I.M.E., 1944, 158, 207.
5. U. S. Patent 2,062,335.
6. F. Giolitti, Cementation of Iron and Steel, New York, 1915.
7. W. E. Jominy, University of Michigan, Eng. Res. Bul. 18 (1931).
8. A. Bramley and H. D. Lord, Jnl. Chem. Soc. 1641 (1932).
9. G. Takahasi, Sci. Rep. Tohoju Imp. Univ. 1926, 16, 159.
10. A. Johansson and R. von Seth, J. Iron & Steel Inst. 1926, 112, 295.
11. M. L. Becker, J. Iron & Steel Inst. 1930, 121, 337.
12. H. Schenck, Physikalische Chemie der Eisenhuttenprozesse, Bd., 1, 166.
13. C. A. Liedholm, Metal Progress 49, 1946, 744.
14. A.S.M. Handbook, 1939, p. 1050.

Cincinnati Treatise Covers Basic Concepts of Milling

Supplementing Section One, published about a year ago, which deals with milling machines and accessories, milling cutters and their use, Cincinnati Milling Machine Co., Cincinnati 9, now presents Section Two of its "Treatise on Milling and Milling Machines."

This is a 326 page, 6 x 9 in. volume, bound in flexible, oil resisting cover. It contains a wealth of up-to-date information on the milling process in general; on chip formation; surface finish; cutting fluids; power required for milling, and also on the methods of mounting milling cutters.

Book Well Illustrated

To illustrate the book and to clarify the text matter, no less than 130 halftones, line cuts and diagrams are used. It is worthy of note that both text and illustrations are based on engineering and research carried out recently by the company.

This research program has upset many long accepted ideas as to the behavior of metals when acted upon by cutters of various shapes and under various speeds, feeds, direction of rotation, etc. Data thus gathered have in turn influenced design both of machines and tools.

High speed photography has figured extensively in the research program and many interesting and informative examples of it appear in the book. The material has been compiled by Mario Martellotti, research engineer of the Cincinnati company.

Copies of this treatise are available direct from the main office of the company in Cincinnati—the price being $1.00 each, which includes the mailing charge.

MOLYBDENUM IN THE FOUNDRY....

ROLLS are among many cast and wrought iron and steel products that have been improved by Molybdenum. Very small additions, rightly introduced, yield surprising results. In the case of mill rolls, Molybdenum makes the difference between a reasonably good roll and one that is stronger and and tougher, and especially better adapted for operating at high temperatures.

This is only one of many uses that Molybdenum serves to the betterment of foundry products. Its most valued effects are to strengthen and toughen—especially to improve high-temperature strength and uniformity of strength in both light and heavy sections. Foundry practice need not be altered at all when Molybdenum is added to any iron or steel composition.

The Molybdenum Corporation has a special pamphlet on the foundry uses of Molybdenum. As a supplier of Molybdenum, Tungsten, and other alloying materials, the Corporation welcomes the inquiries of any user.

MASTER CRAFT ALLOYS

AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; Bromley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

Works: Washington, Pa.; York, Pa.

Mines: Questa, New Mexico; Urad, Colorado.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

SIMPLICITY OF DESIGN AND RUGGED CONSTRUCTION *that produce Long Life*

★ Horsburgh & Scott Helical Speed Reducers are engineered for simplicity of design with every part ruggedly built from the finest materials. These features plus precision manufacture and assembly are your guarantee of better speed reducers that last longer . . . it will pay you to investigate these single, double and triple Helical Speed Reducers.

Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Melting and Casting

(*Continued from Page* 88)

built by Heraeus Vacuumschmelze[8]).

Rohn pointed out some of the difficulties involved in construction as the vacuum furnaces became progressively larger. This is so since tapping of the furnace causes strong forces on the side of the crucible which requires that the particles making up such a crucible be strongly embedded. However, such a condition of solid embedding leads to tensions during thermal expansions which are experienced during the heating of the crucible. For the 4 ton furnace an electrically sintered magnesia crucible lining was used which consisted of 88 per cent fines, 10 per cent coarse grain and 2 per cent silica for bonding. It was found that a 6 in. thick lining was capable of withstanding temperatures of more than 3450° F even under the most pronounced stresses.

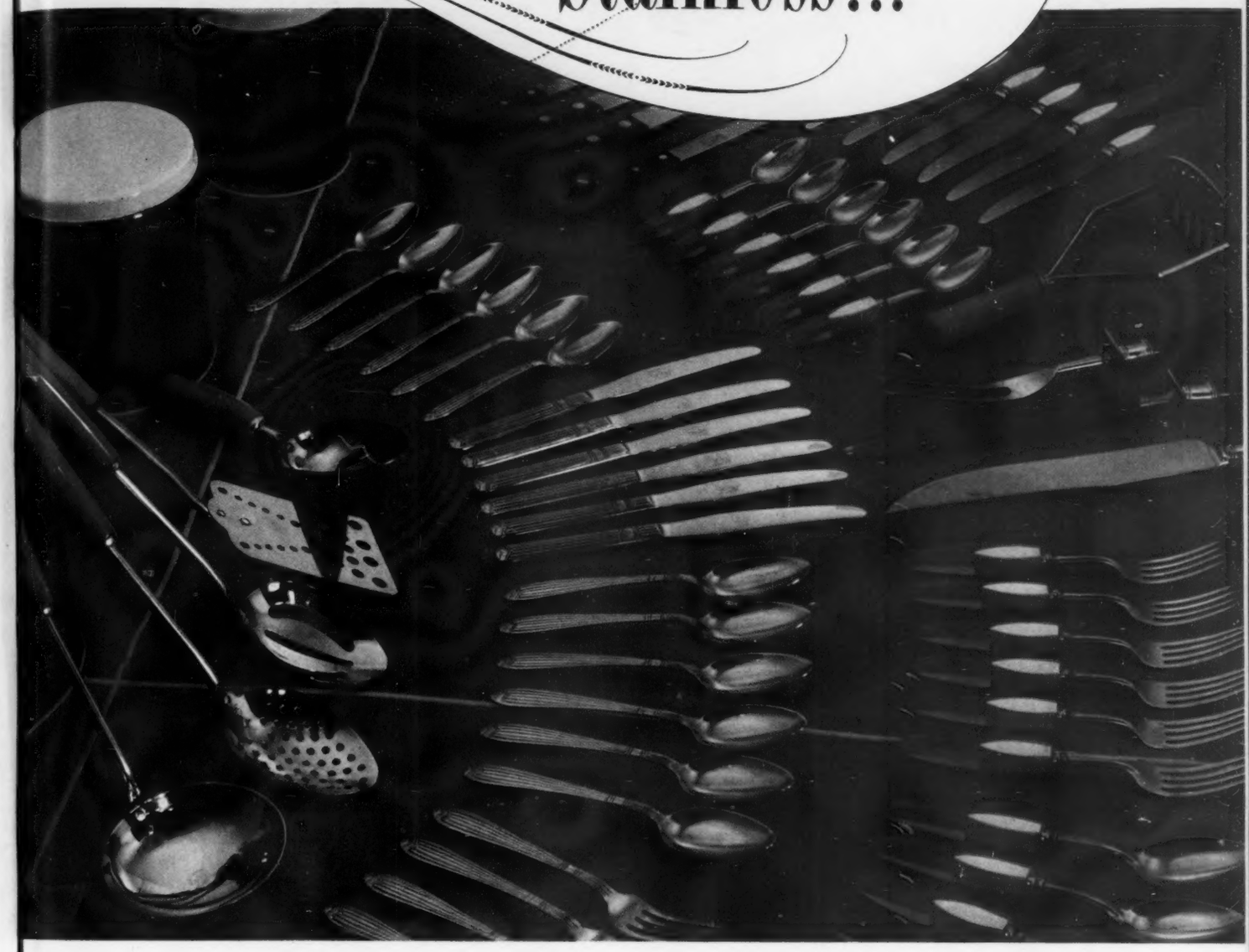
Design Considerations: According to Rohn[3] the resistance furnace has the basic disadvantage that the heat developed from the outside acts on the material to be melted, therefore, the temperature at the heat conductor must always be considerably higher than the temperature in the melt. Reactions between the molybdenum, used as heat conductor and the alumina sinter, occur at temperatures about 1800° C which leads to the destruction of the heat conductor.

Because of this, he was early led to appreciate the value of the Ajax-Northrup high frequency induction furnace in which the energy passes freely through a refractory furnace wall and maintains the charge to be melted as the hottest part of the furnace. Northrup had built such a furnace for melting metals in a vacuum and had described it in 1917 among his earliest furnace disclosures (U. S. Pat. 1,286,394). Rohn incorporated this principle in his furnace work, thus making the selection of the material of construction for the crucible and the insulation much easier.

Northrup had supplied many vacuum melting furnaces to the trade by the early twenties; these were powered mostly by spark gap converters and were used for precious metal and laboratory work. With these furnaces, the energy was passed through not only the refractory wall of the melting crucible but through a fused silica sleeve which comprised the wall of the vacuum sealing chamber. Rohn advocated the commercial use of vacuum melting for the commoner alloys requiring large scale production and tried to develop a furnace which would justify his views.

In the high frequency vacuum furnace evolved by Rohn's work (Fig. 3), it is interesting to note that casting of the

Beautifully Stainless...



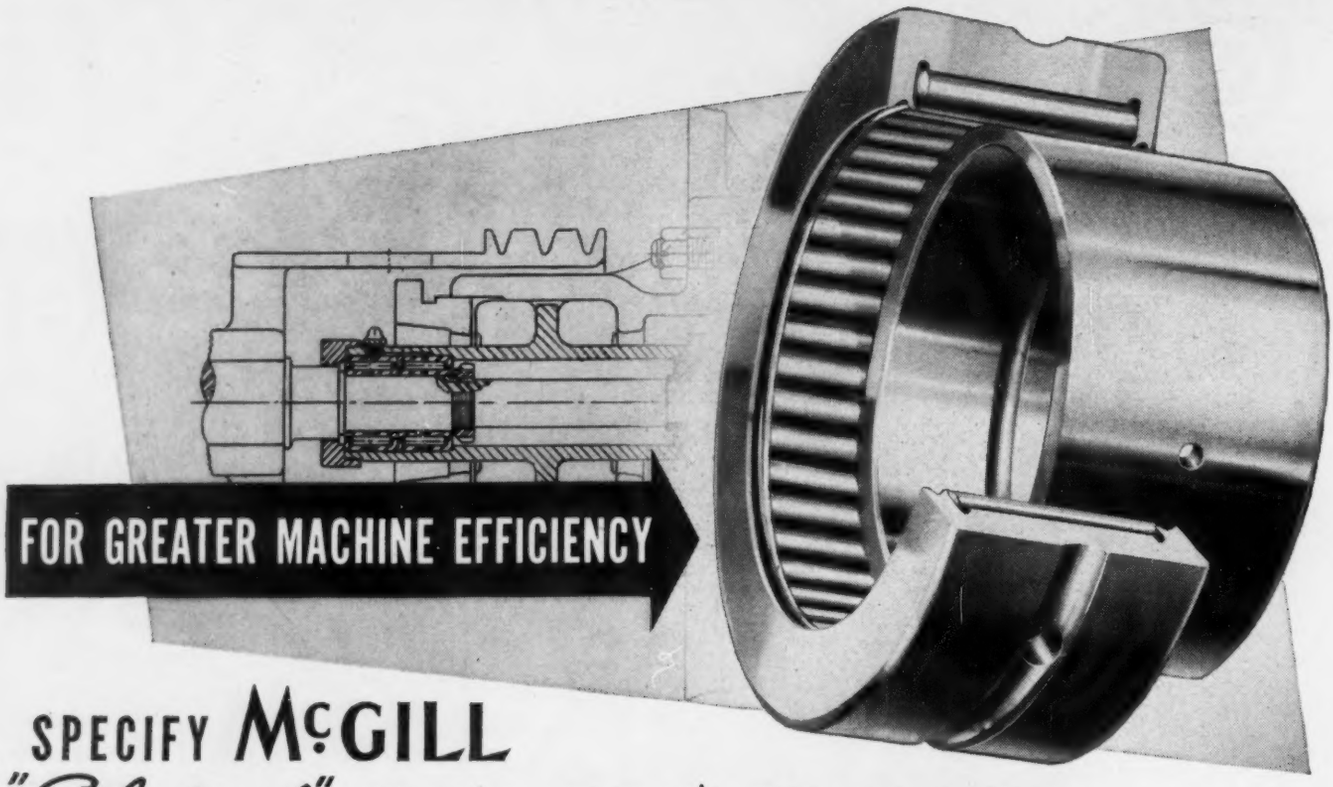
and easier to make, with

Superior STAINLESS STRIP STEEL

Modern tableware . . . cutlery . . . kitchen tools . . . all providing *beauty in service* for the consumer, and *ease of fabrication* for the manufacturer . . . made of SUPERIOR Stainless Strip Steel!

Superior Stainless behaves well for the fabricator because it's a specialized product. We're specialists in strip steels, and we give special care to the control of stainless quality in grades, tempers, dimensions and finishes. Your work is speeded when you use Superior Stainless. Send us your specifications—or let us give you an experienced recommendation!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA



SPECIFY McGILL "Solidend" MULTIROL* BEARINGS

• MORE LOAD CAPACITY

The "Solidend" *MULTIROL* design specifies roller ends that increase effective roller length. This provides a maximum race and roller-load carrying-contact. Superior design and the best in bearing steel assures the ultimate in full type roller bearing capacity.

• LONGER LIFE

Rigidity of construction and adequate lubrication facilities—including a reservoir in the outer race—guarantees minimum wear and longer life. Specially formed shoulder lips eliminate delicate washers and roller retaining rings.

Bulletin SM-42 contains complete engineering data. Write for your copy.

• COMPACTNESS

An important design feature of the McGill "Solidend" *MULTIROL* Bearing is compactness. The bearing can be used without the inner race. This application is especially appreciated when greater load carrying capacity is required and radial space is limited.

*Trade Mark Registered

McGILL MANUFACTURING CO., INC. VALPARAISO, IND.

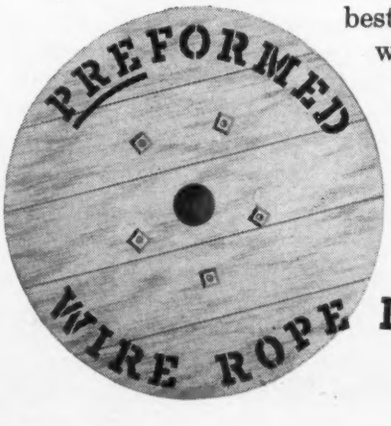
401 North Lafayette Street

MANUFACTURERS OF BALL AND ROLLER BEARINGS

This hot-ladle crane cost more than $100,000 . . . but as it is it couldn't work!

This gigantic, 100-ton, ladle crane cost well over $100,000—but it couldn't pour a drop of molten metal without wire rope. That's what's missing in this picture. How much does wire rope cost? Ordinary wire rope—about $1500. The superior wire rope—Preformed Improved Plow Steel—about $1800.

Be safe. Be sure. Don't let penny wisdom keep you from having the best. Specify Preformed of Improved Plow Steel for your next rope. And when you buy a machine—any machine—make certain it is equipped with Preformed. You will like it because it lasts longer. Your workmen will like it because it is easier and safer to handle.



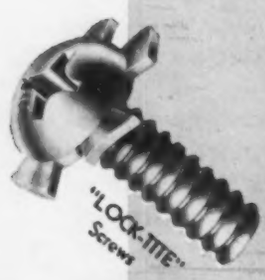
WRITE FOR FREE COPY of helpful book about Preformed. Address: Preformed Wire Rope Information Bureau, 520 North Michigan Avenue, Chicago 11.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

HANDLES EASIER - LASTS LONGER

HOLTITE

Industry's Dependable Source For Every Type Of Fastening



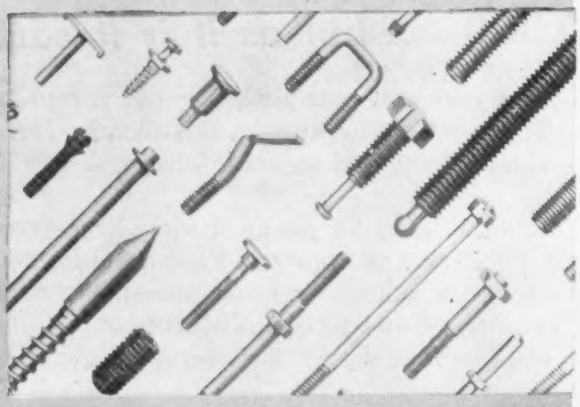
However complex or simple your fastening requirements may be, they can be met by the comprehensive range of standard or special HOLTITE items produced by the Continental Screw Company.

For over 43 years this progressive plant has kept step with the advance of American industry—meeting its current needs as well as anticipating its future requirements. In the extensive HOLTITE plant skilled engineering talent supplements completely modern equipment, Chemical and Metallurgical Research Laboratories, and every modern scientific inspection and testing device. In short, we are equipped with the most capable men, methods and machinery to provide a dependable source for every type of modern fastening. Specify HOLTITE for efficient, economical application in every assembly.

SPECIALS

Frequently, a special fastening or part designed for a particular purpose will replace several standard fastenings or parts and effect definite savings in labor and material costs.

We have complete facilities for producing specials exact to your specifications, blue prints or samples.



CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.

charge is done by means of a tap hole located in the bottom which is opened by means of high frequency. The proper tap hole was formed out of a ceramic type of material which was surrounded by a small high frequency coil. In this ceramic body there was inserted a metal peg of the same alloy as the charge. During the heating and melting-down the peg was protected by cooling the small high frequency coil. After the melting operation was finished the small high frequency coil was put in operation and by melting the metal peg, the tap hole was opened for casting.

It has been pointed out that the vacuum furnace is in the first place a pure remelting furnace so that to some extent its value depends on using unobjectionable starting materials, although readily volatile impurities such as hydrogen, nitorgen, oxygen, zinc, bismuth, lead, etc. are removed from the charge during the melting process. Great advantage of the vacuum furnace is that the customary addition of deoxidation materials can be avoided. Also, as a result of keeping the atmosphere away from the melt, no oxidation of the easily oxidizable constituents of the melt can occur so that loss by burning can be kept very small. Thus, if pure starting materials or analysed unmelted material are used great accuracy can be obtained in the composition of the alloy obtained.

Fundamental Applications: Reactions can be carried out advantageously in the vacuum furnace if the reaction products are of a gas forming nature. In this way, for example, existing metal oxides can be converted with carbon. If the oxide content of the starting material is known, reactions can be carried out so that the carbon content remaining is as small as possible. An example is cited from Rohn's practice wherein a 0.2-0.4 per cent carbon, chromium-nickel steel is decarbonized by melting in a vacuum furnace to 0.01 per cent carbon, and in some instances to even smaller carbon contents. Rohn observed early in his work that the quality of the alloys melted in a vacuum exceeds that of the same alloys prepared by other processes as a result of the degree of freedom from gases and other impurities. In general, alloys prepared by vacuum metallurgy were found to have superior softness when compared to alloys prepared by other means, assuming that the other usual properties such as grain size, composition, degree of deformation, etc. are the same. Also, for the preparation of certain alloys such as beryllium alloys or other alloys with easily oxidizable constituents, the vacuum furnace is considered superior to the normal high frequency furnace.

It was early recognized that a very essential factor in vacuum melting is

with TOCCO Induction Heating

IN the de-soldering of gas meter panels a large mid-western gas company reports the following improvements with TOCCO Induction Heating:

With former hand method, it was possible to clean and de-solder about 10 tops per hour ("5-light" size meter). Top panels are 7" x 9½".

Now 6 times as fast. With a TOCCO 7½ KW Machine, one man de-solders about 60 panels per hour. Cleaning is eliminated. He simply places the meter in a fixture and presses TOCCO button. Solder melts in about 16 seconds and panel drops off. Floor-to-floor speed is about 60 seconds. Output is 60 per hour . . . 600% as fast as former method. Working conditions are better because heating is localized in work.

The TOCCO Engineer will gladly analyze your soldering, brazing or heat treating problems for similar improvements.

THE OHIO CRANKSHAFT COMPANY

FREE BULLETIN

TOCCO

Mail Coupon Today

THE OHIO CRANKSHAFT CO.
Dept. S-3, Cleveland 1, Ohio

Send free copy of booklet, "INDUCTION HEATING".

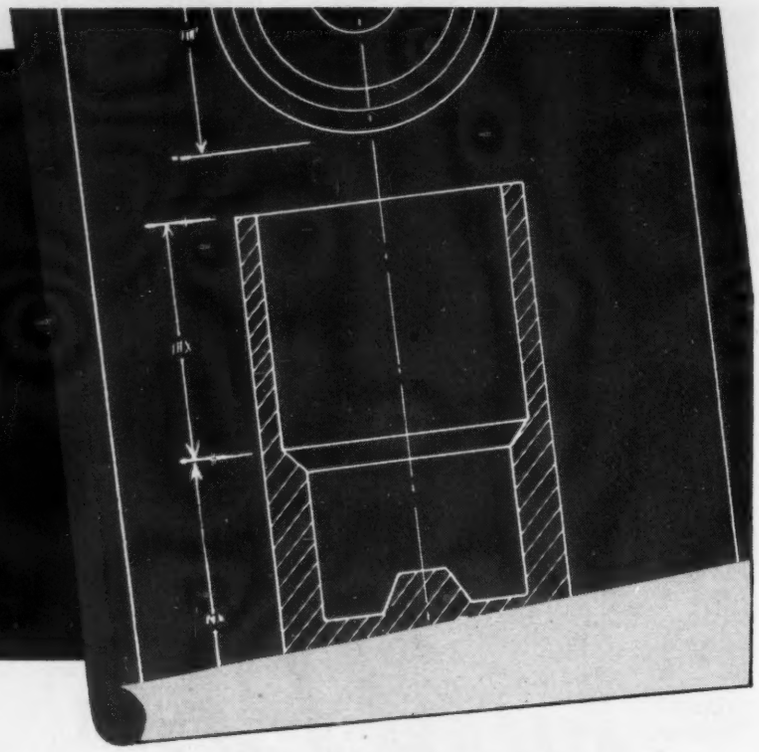
Name.....

Company.....

Address.....

City.....Zone... State...

molds made of GRAPHITE... retain dimensions in repeated use



Molds made of International Graphite can be used over and over again—far longer than other types of molds in common use. Users have proved this fact repeatedly—in actual casting operations. International Graphite molds combine the *right* chemical, mechanical, and thermal characteristics to retain their shape and strength at white hot temperatures. That's why International Graphite has proved extraordinarily successful in the casting of carbides and high melting alloys, sintering under pressure, centrifugal casting, in *many* difficult applications.

Available Sizes: Graphite Mold Grades

3 x72"	16 x60"
4 x72"	18 x60"
5⅛ x72"	20 x66"
6 x72"	4x 4 x30"
7 x72"	8x 8 x48"
8 x72"	16.3x16.3x48"
9 x72"	2x10 x72"
10 x72"	3x 6 x72"
12 x72"	3x 9 x52"
14 x72"	4x10 x72"

Other advantages of Graphite Molds: no spalling or cracking; easy machineability; not wet by molten metals... no sticking; low thermal expansion... no deformation at high temperatures; no inclusions in ingots or castings; light weight and low cost.

Discover for yourself *all* the advantages of Graphite Molds in *your* casting operations. Demand *International* Graphite Mold material for the best results in economy and all-round satisfaction. Write for details and prices today.

Other International Graphite Products

Electrodes—for electrothermic and electrolytic purposes

Rods—for open, blind, and semi-blind risers

Mold Plugs—for ingot molds

Granular Graphite

Graphite Specialties

International Graphite & Electrode Corp.

SAINT MARYS, PA.

casting in a vacuum. The alloys melted in the vacuum furnace under the cleanest conditions encounter the danger of new oxidation if they are cast in the open. Without the benefit of vacuum casting techniques, alloys must be cast as quick as is possible with regard to the freezing conditions of the ingot concerned. By melting and casting under vacuum the velocity of casting can be slowed down so as to produce a fine grained ingot structure with alloys that are inclined toward spiky crystallization.

The work by Rohn has emphasized the usefulness of the vacuum melting process in preparing alloys with special physical properties. Special alloys with high permeability (weakly magnetic alloys) can advantageously be prepared by vacuum metallurgy from nickel-iron and silicon-iron bases. With weakly magnetic alloys, the absence of small quantities of gas forming elements plays a large part. Alloys with special coefficients of expansion, which among other things, are used for thermobimetallics are prepared with advantage in vacuum furnaces. In alloys with high chromium content, vacuum metallurgy has a marked effect on the ductility of the alloy, which has been attributed to the result of removal of nitrogen as well as other gases.

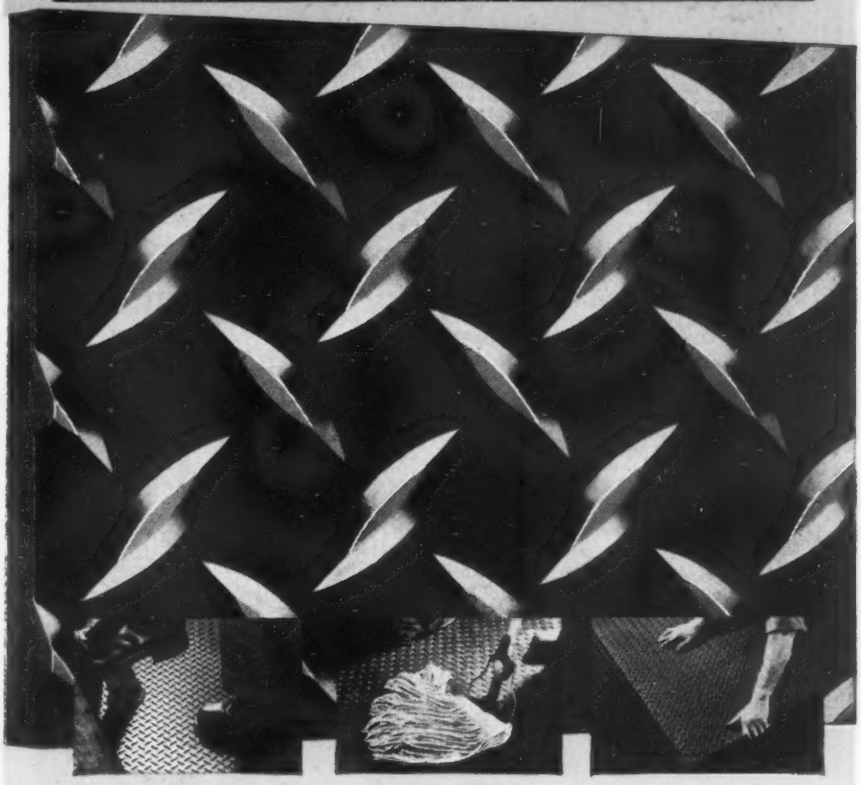
Use of vacuum melting for preparing beryllium alloys, according to Rohn's technique using a furnace of the type shown in Fig. 3, has proved especially useful since a gas free cast may be prepared which is as free of oxides as possible. It has been pointed out that the use of the vacuum furnace for handling of carbon steels capable of being hardened at one time aroused great hope among the group of German investigators. However, these hopes have not been fulfilled due to some extent to the fact that the method is not economically productive for low alloy steels, and also to the difficulty of preparing steels with a definite quantity of carbon as a result of the reaction of the carbon with the oxides of the melt and in some instance with the oxides of the container.

American Furnaces: Dating from about 1917 interest in this country has steadily grown in vacuum furnace work. In 1931 Reeve[3] of the Bell Telephone Laboratories described a laboratory type vacuum furnace in which the charge could be watched during melting and in which the charge could be poured under vacuum conditions. A diagram of the Reeve furnace is shown in Fig. 4. According to Reeve, the method of melting a metal or alloy in a vacuum and allowing it to freeze in the crucible prevents atmospheric contamination but has two serious disadvantages. Pipes of relatively large dimensions are formed

EXCLUSIVE

THERE'S ONLY ONE STATUE OF LIBERTY...AND ONLY ONE

AW SUPER-DIAMOND FLOOR PLATE



GRIP WITHOUT A SLIP! EASY TO CLEAN! EASY TO MATCH!

There are many floor plate patterns but only One AW Super-Diamond Pattern. It's the exclusive super-safe pattern created especially to give you safer, stronger and longer lasting loading platforms, stair-treads, floors, walkways and hatch covers. It grips without a slip. Is easy to clean and easy to match. End your floor maintenance worries by installing AW Super-Diamond Floor Plate now.

FREE A New 16-Page Booklet, L-29 It's chock-full of helpful information: weight, sizes, etc. Write for your copy now. Alan Wood Steel Co., Conshohocken, Penna.

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

A Product of ALAN WOOD STEEL COMPANY

Other Products: Billets • Plates • Sheets • Carbon & Alloy

Fire Resistive
DESTRUCTION
That is!*

That's no joke son. Iron and steel do not make a building "fireproof," a term reasonably applied to buildings constructed of steel, brick, concrete, or other noncombustible materials. For a structure is only as "fireproof" as are its contents, and a blazing interior fire would quickly reduce that structure to a shambles of twisted steel and broken concrete.

This picture of destruction is not a pleasant one—nor a needed one. For with ever watchful "Automatic" Sprinkler Protection, fire just doesn't have a chance to make headway . . . it's stopped at its origin . . . damage is held to a minimum.

—a famous member of the "Automatic" Sprinkler Family. Provides adequate protection for quench tank, transformer, oil line and other fires of flammable liquid origin.

Loss of life by fire or cessation of manufacturing and selling operations because of fire is inexcusable. Such losses are needless and incalculable. 24-hour a day fire protection for every business is a must.

Call upon an "Automatic" Sprinkler engineer for assistance on any fire protection problem. He can even show you how savings will pay for installations.

* With apologies to Senator Claghorn

FIRE PROTECTION
DEVELOPMENT ENGINEERING
"Automatic" Sprinkler
MANUFACTURE INSTALLATION
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

in the interior of the ingots and in the case of alloys, segregations may occur due to the slow cooling.

Furnace designed by Reeve for melting and pouring in vacuum was found to be quite satisfactory for casting of metals in laboratory quantities. The original furnace was built to melt up to about 600 grams of metal and for an energy source used a 35 kva Ajax-Northrup high frequency generator. The induction coil was mounted on an asbestos board capable of being tilted slightly more than 90°.

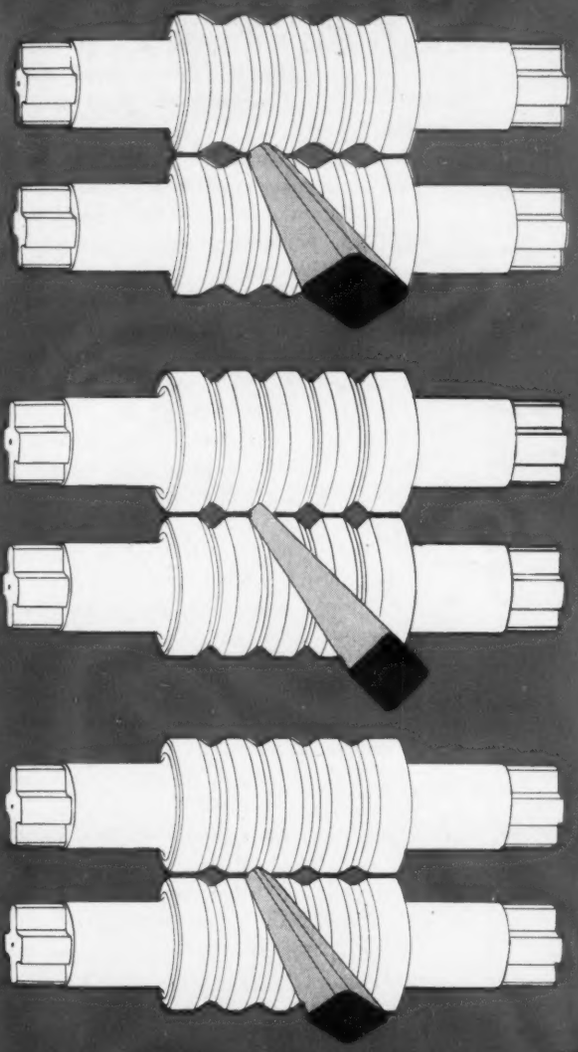
For larger scale laboratory and semi-production work, generally, similar furnaces powered by motor generator units have been built by the Ajax Electrothermic Corp. for the Bell Telephone Laboratories. These are capable of melting 50 lb of steel either under vacuum or under special atmosphere conditions (Figs. 1 and 5). Furnaces of this type are reported to be in present day use in many other laboratories in this country and abroad. The Soviets, lately, have shown unusual interest in vacuum melting furnaces. Fig. 7 shows a high frequency vacuum furnace of the latest Ajax-Northrup design. These furnaces are produced in capacities up to 200 lb or over and are so constructed that the fully encased mold pivots and remains vertical during pouring.

Many kinds of seals are used in the present day vacuum furnace. For converter operated furnaces, the vacuum chamber has been largely a silica sleeve with parallel ground ends self-sealed with a water cooled metal disk and a thin rubber gasket[1]. A special vacuum grease sometimes is used to back up the rubber. Where this type of construction is used, the furnace coils are outside of the chamber. Voltages, wave shapes and frequencies are such that corona and arcing would occur if the coils were in the vacuum chamber.

With the larger generator operated furnaces, the coils usually are operated at low voltage within the vacuum chamber. Seals are of rubber which at times are backed up with grease and in some instances with glyptal lacquer. Seal used by Rohn[4] for this type of furnace is a plastic seal which could be melted by a heating unit and frozen by a cooling unit. Vacuum ranges for these larger furnaces probably can be as low as a few microns but much work for which they have been used requires vacuum conditions of only 0.1 to 10 mm. In general, low vacuums are attained by the combination of mechanical and diffusion vacuum pumps with large evacuating ports. The intermediate pressures can be maintained with ordinary mechanical pumps.

Handling the charge in a vacuum has always presented a problem in the design

ROLLING TECHNIQUE . . .

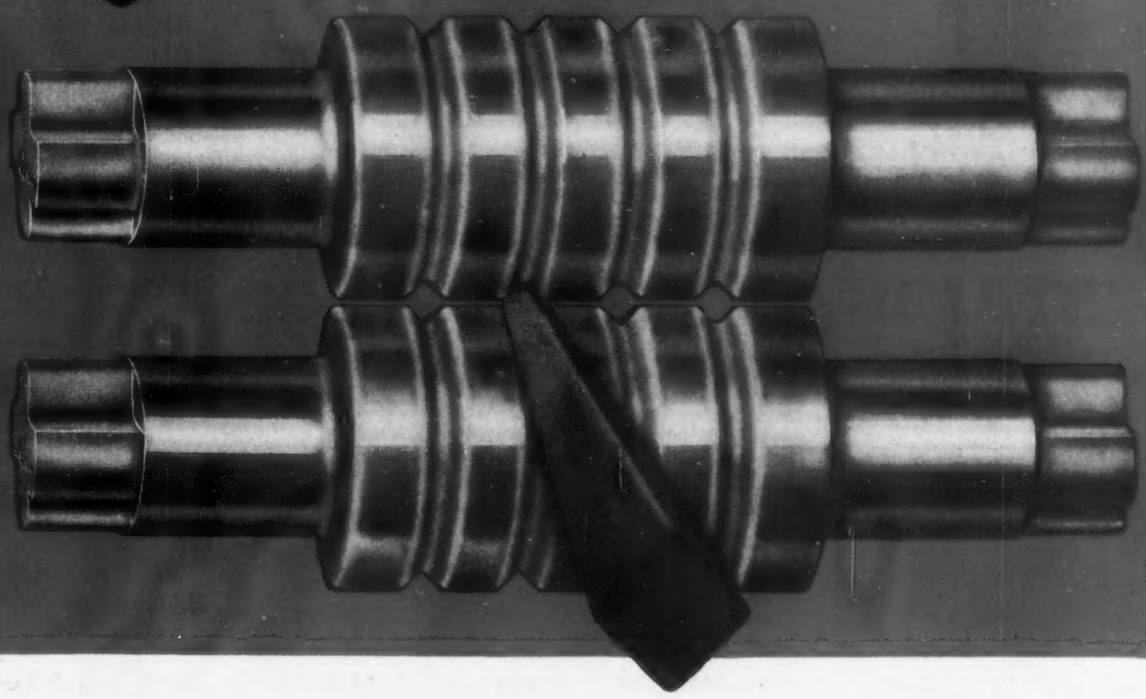


Billets

Billet Mills are designed and built with the prime purpose of producing high tonnages of semi-finished steel. This requires rolls that will stand up over a long period and still retain a smooth surface, thus keeping billet reconditioning cost at a minimum.

Pittsburgh Rolls are made by skilled craftsmen whose thorough practical knowledge of metallurgy, foundry methods and accuracy in roll turning is the accumulated result of over seventy-five years devoted to the exclusive manufacture of Rolling Mill Rolls. The use of Pittsburgh Rolls can result only in *less cost per ton of steel rolled.*

PITTSBURGH ROLLS
Division of Blaw-Knox Company
PITTSBURGH, PA.



Manufacturers of Rolls For Steel Mills For 77 Years

PITTSBURGH ROLLS

WHY
CARRY
WHEN YOU
CAN
CONVEY

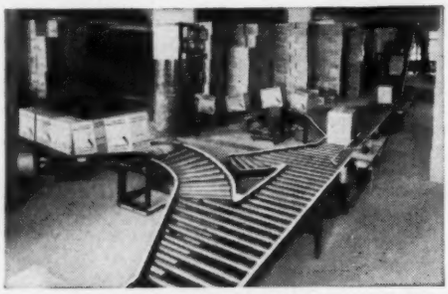
Carrying is the oldest form of material handling—modern production demands faster, cheaper and more efficient material handling — conveyors.

Investigate the use of conveyors. Conveyors handle a wide variety of parts, packages, units, cans, bottles, barrels, bundles, drums and boxes. Available in light, medium or heavy-duty types — portable or stationary — as systems, sections or units — power or gravity fed, they give you remarkable savings in time, money and manpower conservation. They relieve confusion and congestion.

Standard Conveyor Company has the experience and facilities to engineer, recommend and furnish the right type of conveyor for your particular needs.

Write today for catalog No. ST-47 "Conveyors by Standard" — a ready reference on conveyor types and systems.

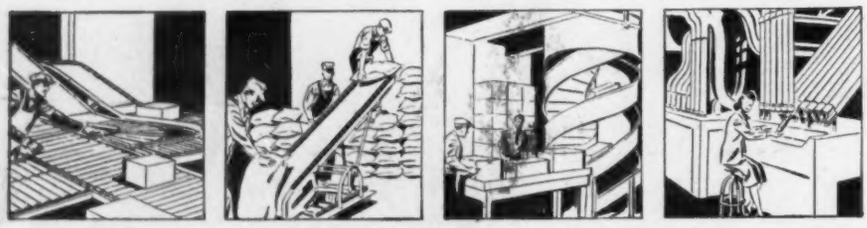
PRODUCTION LINES
No congestion — order and cleanliness when production moves on conveyors.



WAREHOUSES
Merchandise flows in and out of storage with order and system on conveyors.

LOADING DOCKS
Load or unload shipments in half the time with conveyors.

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities



ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

of furnaces. The simplest arangement has been to adapt the crucible to hold the entire charge in a cold state and to so form the charge that it will melt together and will form a molten pool without hanging up on the crucible wall. Sometimes the melt is allowed to solidify under the same vacuum conditions in the crucible, but disadvantage of this method has already been pointed out which is that objectional pipes may result.

In some furnaces the charge can be made by mechanically or electrically operated dumps inside of the chamber. Additions too, can be made in this way. The operation can be watched through sight holes sealed with heat resistant glass windows in the furnace top or sides. Sometimes the actuating arms may be operated from the outside through grease and rubber seals.

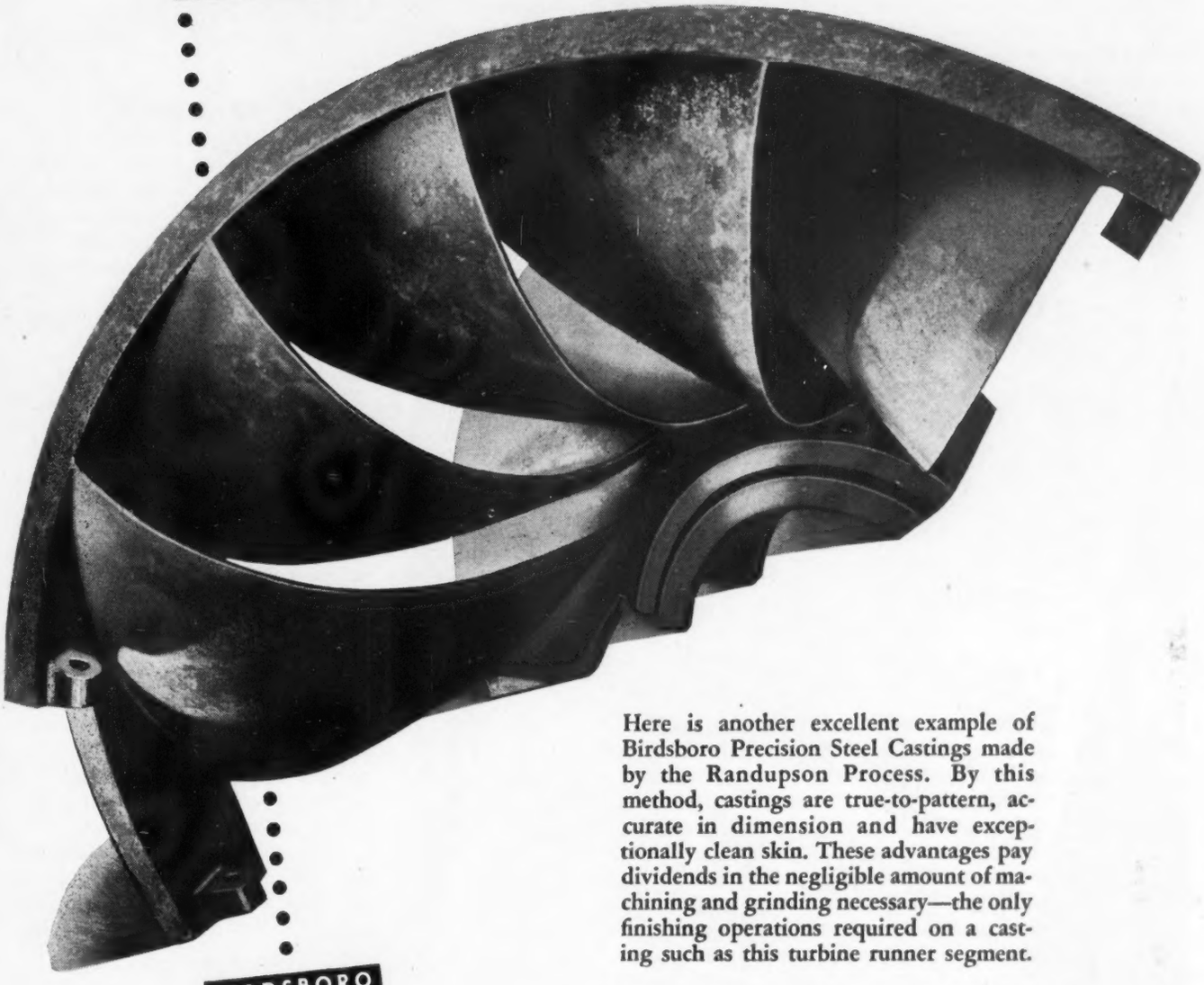
Pouring a charge under vacuum conditions has been accomplished by tilting the chamber containing the crucible and mold so that the metal will pour from one into the other as is shown in Fig. 8. Sometimes it is advisable to adapt the furnace so that it can be tilted in several directions to fill several molds. One of the latest and best designs is to have the mold pivoted about the axis of tilt of the furnace chamber proper so that the mold remains upright and stationary as the charge is poured into it (Fig. 7).

Oxygen Determination: Work carried out at the National Bureau of Standards has demonstrated that the vacuum fusion procedure is the most reliable method for the determination of total oxygen in steel[8]. The methods employed for the determination of oxides and oxygen in ferrous materials may be roughly classified into two groups—"wet" methods and "hot" methods. First group includes the iodine, electrolytic, mercuric chloride, hydrochloric acid, nitric acid, and chlorine methods; the second group includes the vacuum-fusion and hydrogen-reduction methods[8].

The wet methods depend upon preferential solubility in a selected medium to separate the metallic portion of the sample from the oxygen containing constituents. Subsequent analysis of the insoluble residue permits the isolation and separate determination of individual oxides and compounds. The hot methods depend upon the reduction of the oxide constituents of the sample by means of carbon or hydrogen at elevated temperatures.

Many attempts have been made to design an apparatus suitable for rapid and accurate determinations of oxygen content in steel for analysis control. Indirect methods based on chemical equilibria, whereby use is made of the car-

BIRDSBORO Precision Steel Castings
Save Finishing Time . . .



Here is another excellent example of Birdsboro Precision Steel Castings made by the Randupson Process. By this method, castings are true-to-pattern, accurate in dimension and have exceptionally clean skin. These advantages pay dividends in the negligible amount of machining and grinding necessary—the only finishing operations required on a casting such as this turbine runner segment.

In addition, Birdsboro Precision Steel Castings provide sound uniform metal structure. If you are at all concerned with cost reduction coupled with rigid casting specifications, you'll want to investigate Birdsboro Precision Steel Castings made by the Randupson Process. Call us today.

BIRDSBORO CASTINGS

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY • BIRDSBORO, PA.

Manufacturers of Steel Castings, Steel Mill Equipment, Iron and Steel Rolls, Hydraulic Presses, Crushing Machinery and Special Machinery.

BIRDSBORO

PRECISION STEEL CASTINGS

MADE BY RANDUPSON PROCESS

bon-oxygen curves, are inaccurate because of the wide irregularity of the equilibrium relation and the slowness of accurate carbon analysis. The aluminum-killed bomb test represents an improvement; however, it is an inconvenient method of sampling a steel bath and is not readily adaptable to control purposes since under many conditions of testing, all the oxygen in the bath is not converted to alumina and the results consequently are in error. An improved sampling device and simplified vacuum fusion apparatus known as the Cenco-Derge apparatus[7] has been designed which makes it possible to obtain remarkably accurate oxygen determinations in less than 10 min from the time of sampling until the melter has the laboratory report.

Importance of being able to determine oxygen content while the heat is still in the finishing period is readily apparent. If an oxygen value is determined at the end of the heat, required deoxidation would be established at once. This would result in improved quality and greater ingot yields, especially in semi-killed types. In special cases where extreme cleanliness is important, or when the rate of refining must be controlled, this test has demonstrated its value. The test has proved particularly useful in connection with open hearth work.

In the procedure for using the Cenco-Derge vacuum apparatus, shown in Fig. 6, the special mold of the apparatus is filled from a well-slagged spoon and a sample is broken off and weighed (one to two grams), thereafter it is introduced into the induction furnace through a mercury lock (which permits the apparatus to be kept at high vacuum). It is then guided with a magnet into the furnace which is kept at a temperature of 2800 to 3000° F. Temperature is maintained constant by using an optical pyrometer. The sample melts in about 20 sec and all oxides are reduced by the carbon present in the graphite crucible. The resulting carbon monoxide is collected by a two-stage mercury diffusion pump and compressed into a chamber whose volume has been accurately calibrated. Percentage oxygen is computed from a simple equation.

Future Possibilities: There is little doubt that as a combined reaction and degasing furnace, the vacuum furnace has a definite place in future metallurgical operations. For the production of special steels with the lowest possible carbon content the vacuum furnace serves excellently. Among other future applications it probably will be used for producing many types of alloys possessing special properties, as well as for alloys that contain easily oxidizable and expensive constituents. It has already been shown on a production scale that alloys produced by vacuum melting exhibit unique properties that make them particularly adaptable for high temperature service. The problem of the most satisfactory system of vacuum seals as well as that of efficient crucible construction will also have a bearing on the economics of operation of the high frequency vacuum furnace in production.

REFERENCES

1. Private communication from Mr. F. T. Chesnut of the Ajax Electrothermic Corp. who gratefully supplied much of the information and photographs for this presentation.
2. Hissenbruch U. Schichtel, *Zeitschrift fur Metallkunde* June, 1944.
3. Reeve, *Metals and Alloys*, October, 1931.
4. German Patent 568,097—1928.
5. Private communication from Dr. J. G. Thompson, chief, metallurgy section, National Bureau of Standards, Washington.
6. Trans. A.I.M.E. 125, 246 (1937).
7. Designed by Dr. Derge of Carnegie Institute of Technology and produced by Central Scientific Co., Chicago.

—o—

Welding of mild steel in all positions with alternating or polarity direct current is possible with the SW-2 electrode, offered in four diameters from $\frac{1}{16}$ to $\frac{5}{32}$-in., announced by Westinghouse Electric Corp., Pittsburgh 30. Welds made meet AWS-ASTM requirements for classifications E-6012 and E-6013.

HERE'S WHAT OTHER STEEL MEN SAY ABOUT BUCKEYE SILICA FIRESTONE
● "We get over 50,000 tons per lining in an 80-ton ladle. After lining has been in service two weeks, we can pour hot metal on cold lining... frequently drop heavy pig into ladle. Buckeye Silica Firestone lasts longer . . . and costs less." ---Steel Plant in Pennsylvania
● "We get 75,000 to 80,000 tons out of a hot metal ladle (125-ton capacity)." ---Steel Plant in Pennsylvania
● "We get about four years service from Buckeye Silica Firestone as compared with two years with-------." ---Steel Plant in Illinois
● "We wish to advise that the Buckeye Split Rock Linings have worked out very satisfactory and we will use this material again when we are in the market." ---Steel Plant in Canada
● "During the past three years we have rebuilt soaking pit walls of competing material twice, but the stone is still good and will be for some time." ---Steel Plant in Michigan
● "We are using Buckeye Silica Firestone in soaking pits . . . for the reason that we have found that it lasts much longer than other materials. By the use of firestone we have overcome the squatting and shrinking of the walls in these pits due to the fact that this material does not soften and shrink." ---Steel Plant in Pennsylvania

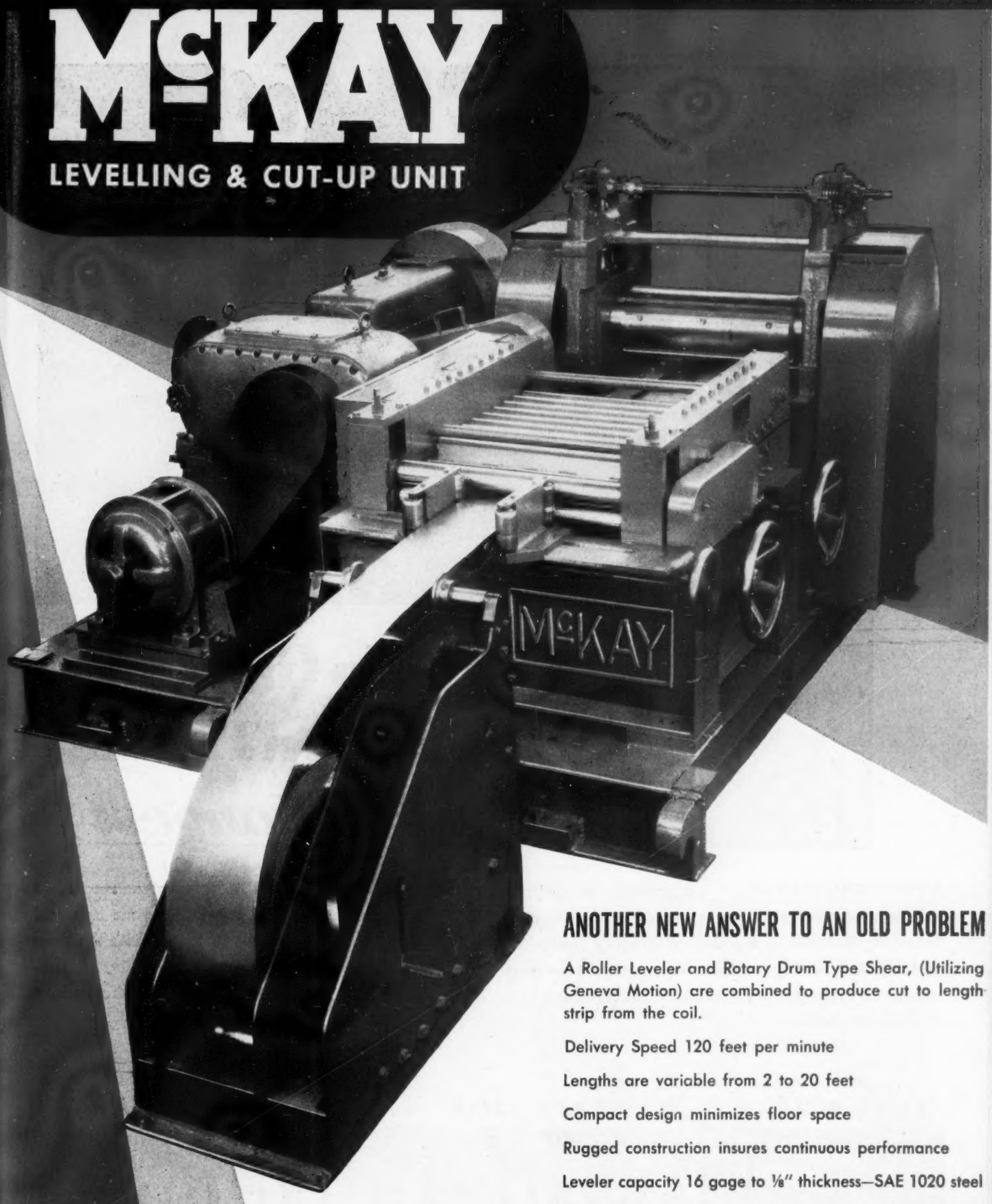
For further information, write

THE CLEVELAND QUARRIES COMPANY
1125 GUILDHALL BLDG. CLEVELAND 15, OHIO

BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

McKAY

LEVELLING & CUT-UP UNIT



ANOTHER NEW ANSWER TO AN OLD PROBLEM

A Roller Leveler and Rotary Drum Type Shear, (Utilizing Geneva Motion) are combined to produce cut to length strip from the coil.

Delivery Speed 120 feet per minute

Lengths are variable from 2 to 20 feet

Compact design minimizes floor space

Rugged construction insures continuous performance

Leveler capacity 16 gage to ⅛" thickness—SAE 1020 steel

Shear capacity 16 gage x 24" or ⅛" x 12"—SAE 1020 steel

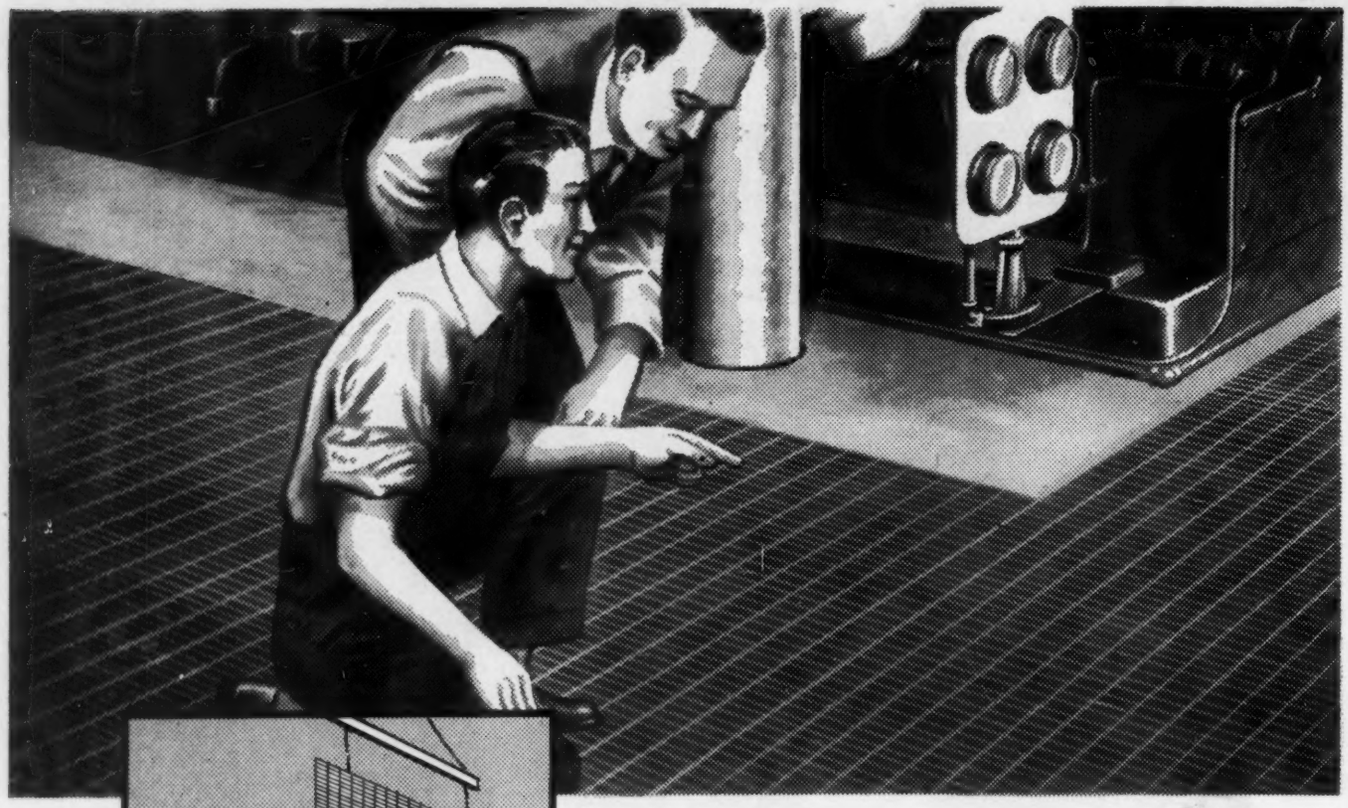
Engineered for low cost high speed production.

The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

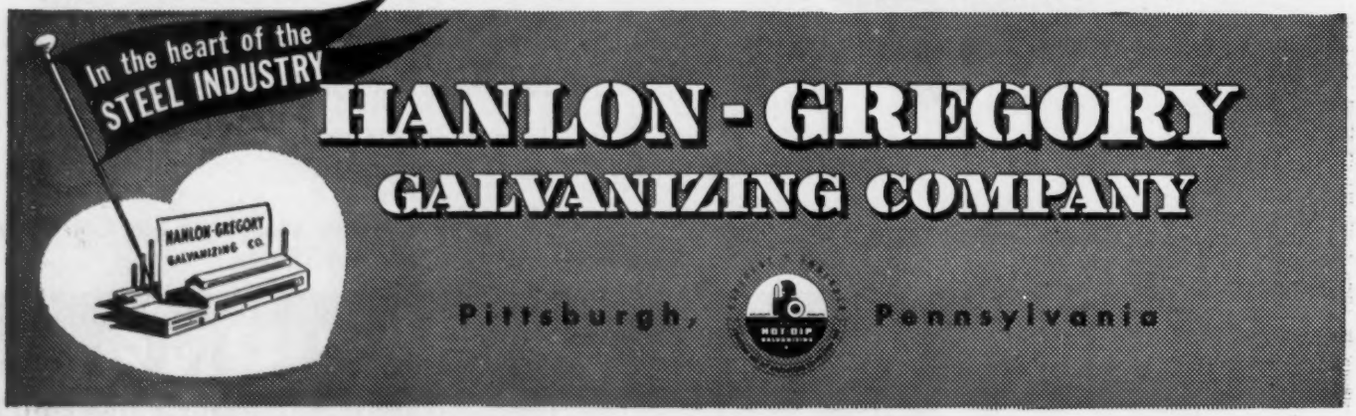


Hot Dip Galvanized Open Steel Flooring *Lasts Longest*

OPEN STEEL FLOORING and grating installations *will* render greater uninterrupted service when protected against rust by the Hanlon-Gregory method of Hot-Dip Galvanizing . . . An investment that pays dividends in savings from expensive replacement and maintenance costs.

The World's Largest Hot-Dip Job Galvanizing Plant *can* increase the life and service of your iron and steel products, whatever they may be, with the *best possible* and *most economical coating* of *protective zinc* . . . Quantities of any size—from truckload to carloads.

THE WORLD'S LARGEST JOB GALVANIZING PLANT



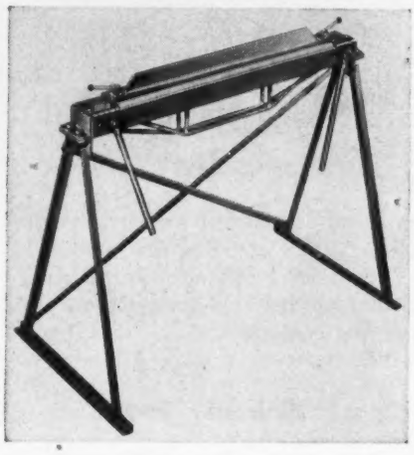
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 150

1. Sheet Metal Brake

A portable sheet metal brake manufactured by Webb Machine & Tool Co., Imperial, Pa., is available in working widths of 31 and 49 in. Both sizes handle 20-gage material, and are equipped with detachable stand.

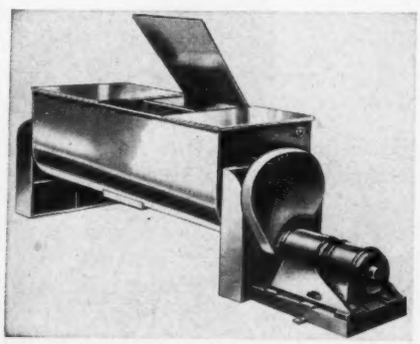
Folding bar of the brake is controlled by case-hardened cams resting on leveling washers that permit even distribution of



pressure. It also raises automatically when pressure is relieved, and can be completely removed for bends that cannot be made with fixed bars. Bends up to 150°, including the Pittsburgh bend may be made. Pan boxes up to 1¾-in. are also produced—without special adjustment.

2. Horizontal Mixers

Several types of single and multiple arm horizontal mixers and blenders for mixing and processing a wide range of materials from dry powders to heavy viscous slurries and pastes are being introduced by H. W. North Co., Erie, Pa. Simple in principle, they are custom engineered for each individual applica-



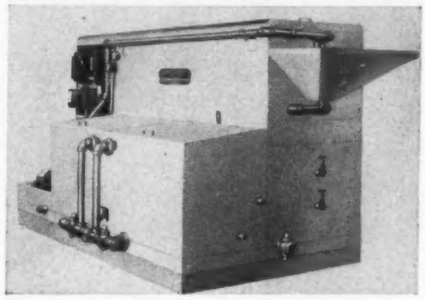
tion—for batch, automatic or continuous operation.

Mixers are available in plain or stainless steel construction with mixing chambers jacketed when required for heating or cooling. Special designs are made for processing materials under vacuum or internal pressure.

Machines are equipped with various combinations of multiple ribbon or paddle type agitators turning on antifriction bearings. Tiltable models are mounted on welded steel supporting stands. Their dumping mechanisms are operated either manually, by electric motor or by a piston actuated tilting device.

3. Washer and Dryer

Screw-drum type machine is announced by Optimus Equipment Co., 177 Church street, Matawan, N. J., for washing and drying metal parts, rinsing and drying



them, or any part of these operations. It also may be adapted for a wash-drain, rinse-drain, cold or hot air dry sequence, or for pickling operations.

Completely closed to avoid air loss, the dryer conducts an air stream through a heater and blower providing either hot or cold air blasts. All parts of the machine are readily accessible for lubrication, maintenance or alterations. Machine is built either with or without a centralized lubrication system.

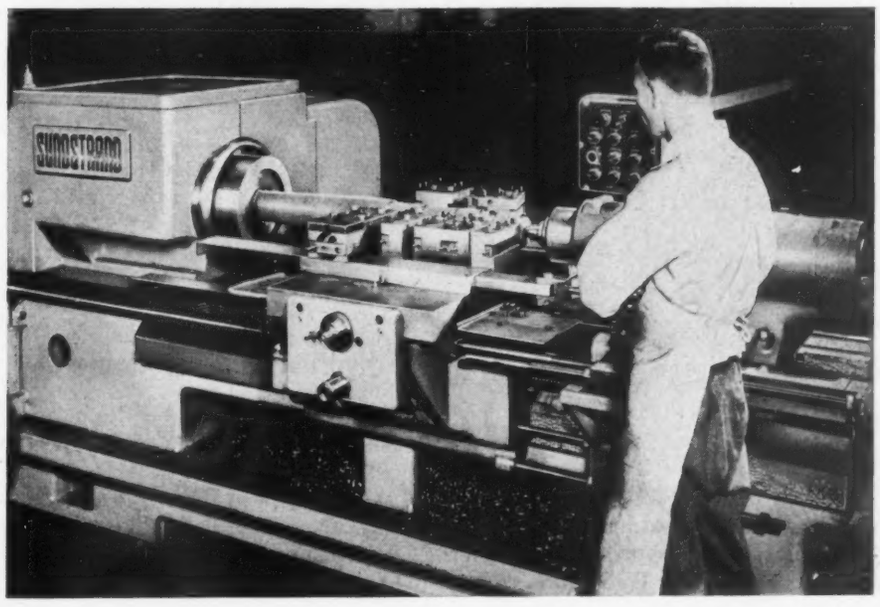
4. Ball Bearing Flange

Self-aligning feature of an SC ball bearing flange developed by Dodge Mfg. Corp., Mishawaka, Ind., makes it suitable for mounting against vertical or horizontal frames and supports. It includes a deep groove precision ball bearing with long inner race and labyrinth seals. Back face of the housing is machined, and location of filling slots at the back also provides added protection against external dust and dirt.

5. Automatic Lathe

Sundstrand Machine Tool Co., Rockford, Ill., announces a model 16 automatic lathe incorporating a quick cycle changeover that makes it possible to multiple tool the machine for short as well as for production runs or chucking. Powered by a 75-hp motor, it has a 17 in. swing over slides and will swing a 21 in. diameter chuck. It also is being made in three bed lengths of 36, 60 or 84 in. between centers.

Both spindle and front carriage drive units of the lathe are provided with two different driving gear centers, providing an increased range between high and

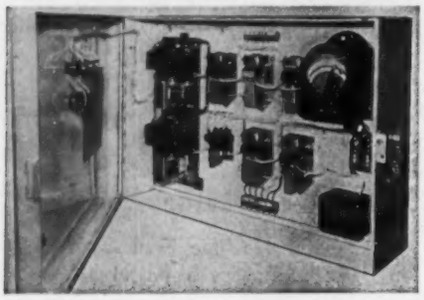


low spindle speeds and high and low front carriage feeds.

Complete control of all cycles is provided by adjustment of dogs on a cycle control disk. Adjusting position of dogs on disk changes lengths of rapid approach, feed and rapid return strokes. Pendant control is provided for easing operation when turning large work.

6. Plating Control Unit

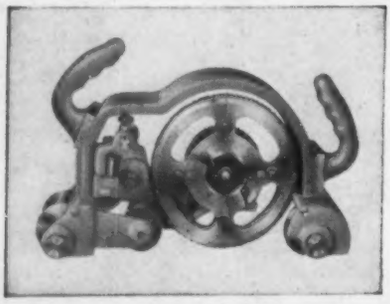
Mechanism to reverse polarity and to control a selected time cycle between positive and negative plating times is announced by George L. Nankervis Co., 5442 Second boulevard, Detroit 2. Identified as the Electro-Reversal control unit, it consists of a moisture proof cabinet in which are mounted complete timer controls, relays, discharge resistors, pilot lights, etc., to control the output polarity of electroplating motor generator sets.



Improved user results have shown that smoother deposits are made possible by reason that treeing, which usually occurs at high current density points, is immediately offset by the reversal phase of the cycle which levels off nodules thus formed. Increased allowable cathode current density which will produce greater plate thickness, is possible even though part of the process employs a deplating cycle.

7. Steel Printing Machine

Jas. H. Matthews & Co., 3978 Forbes street, Pittsburgh 13, has developed a new marking device for printing continuous or spaced impressions on tool steel,



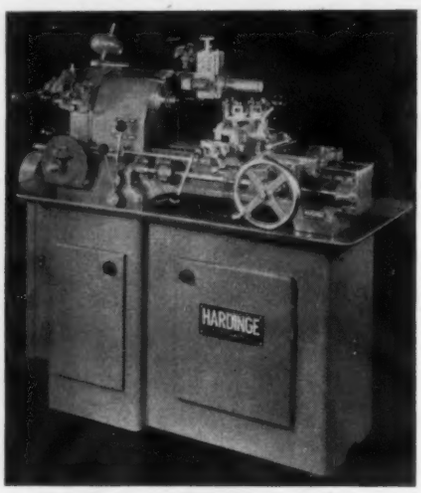
sheet steel or steel tube. It consists of a cast aluminum frame with detachable cast handles which may be easily removed if unit is to be mounted in a fixed position.

Adjustable rolls guide unit during marking operation. Interchangeable segment-shaped rubber type and logotype dies are used in the marker as well as a device that enables type to be changed quickly in any quarter section of the wheel.

An adjustable blade in the ink fountain included in the unit inks over entire surface of the printing roll. Machine prints all sizes of flat and round bars from ¼-in. square or ¼-in. diameter up, flats or sheets ¼-in. wide and up.

8. Chucking Machine

Turning, boring and threading of parts up to 6 in. diameter which have been blanked out on automatic screw machines or turret lathes, are accomplished



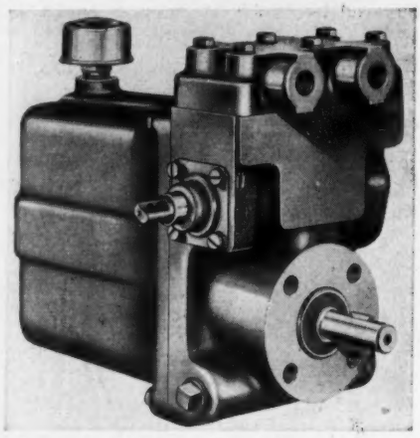
on the multioperation chucking machine announced by Hardinge Bros. Inc., Elmira, N. Y. Its 8-position turret and production threading head use standard tools, making simple setups permissible for low cost tooling.

Headstock spindle of the chucking machine has a speed range of 150 to 3000 rpm in either direction. Spindle takes standard 5C collets, providing a 1 in. round collet capacity through the spindle. Through use of 2, 3, or 4-jaw chucks, odd shaped castings, stampings and forgings may be chucked. Use of single, double and triple tool holders permits as high as 24 single point tool operations to be performed in one set-up. Threads are cut at speeds associated with metal turning; i.e., 1½—20 threads are cut in steel at 500 rpm.

9. Hydraulic Power Unit

New hydraulic Power Pack unit, manufactured by Vickers Inc., 1480 Oakman boulevard, Detroit 32, is composed of a vane pump, relief valve, various combinations of single and double operating valves, an oil filter, air cleaner and oil tank. The compact 45 lb unit can be attached to any power drive, directly, with V-belt, chain drive or gears.

Available with nominal pump delivery of 2, 3, or 5 gpm at 1200 rpm and 1000 psi, it develops hydraulic pressure to lift, lower, push, pull, stack, load and hold



any load, depending on the cylinder size used. Unit is used for power operation of construction and maintenance equipment, industrial machinery, and materials handling equipment.

10. Air Hydraulic Press

Air-Hydraulics Inc., 401 Broadway, New York 13, announces 6-ton air hydraulic press which may be used for assembly, riveting, embossing, staking, sizing, crimping, flanging, etc. on metals, plastics, and leathers. It is offered in both bench and floor models.

Press combines the speed of air, the smoothness and power of oil, and modern

engineering to eliminate noises, shock damage and operator fatigue. It may be plugged into the present airline, working on a 120 to 1 ratio. Ram pressure is adjustable from delicate pressures up to 12,000 lb. The same pressure is delivered throughout the entire length of the stroke. Ram speed is adjustable from the slowest action to 300 ipm; the stroke is adjustable from 1/16 to 5 in.

Presses are being made for a predetermined ram dwell or for single cycle or automatic action. Foot, hand, or

solenoid push button control valves are used.

11. Fork Truck

All types of materials are unloaded onto the floor with a gentle push by a "pusher" device which may be mounted on fork trucks made by Clark Tructractor Division of Clark Equipment Co., Battle

Creek, Mich. Retainers are used to hold the pallet in the job illustrated, but other types of loads may be deposited with the pallet if desired.

Pusher device has a maximum stroke of 52 in. and a thrust capacity of 4000 lb. It is available on the Carloader and Utilitruc made by Clark.

12. Sensitive Relay

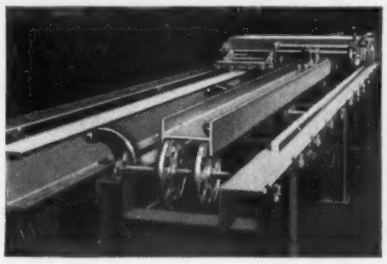
Ward Leonard Electric Co., Mount Vernon N. Y. announces a new Bulletin 108 sensitive relay of the plug-in type mounted on a standard octal plug base and enclosed in a cylindrical metal can that is hermetically sealed against moisture, gases, dust and other detrimental atmospheric conditions. It is provided with a normally open single pole contact having contact ratings of 2 amp, 24 ac or dc, 0.75 amp, 125 dc and 2 amp, 125 ac (ac ratings are for noninductive loads at commercial frequencies).

With a low average coil consumption of 0.056, relays are suitable for current sensitive applications from 1.3 milliamperes to 0.54 amp on direct current, and are applicable for operation on nominal voltages from 0.1 to 48 v dc.

13. Spacing Table

Beatty Machine & Mfg. Co., Hammond, Ind., announces a new, simplified, spacing table, that handles I-beams of varying weights and sizes for flange punching without any adjustment of the spacing table. Improved handling of I-beams is accomplished by carrying the beam on the underside of the top flange which, regardless of size or weight of the I-beam, is always at die level and free to pass over dies.

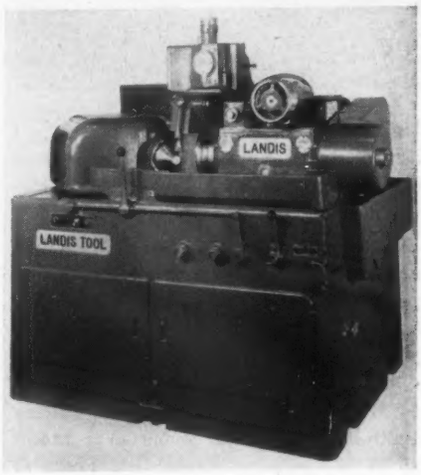
When a beam is placed on table, arm carrying the one set of rolls is opened by means of an air cylinder. After the beam is partially lowered into the table, arm is closed by air cylinder and beam is fully lowered until underside of upper flange rests on the roll. Spacing table carriage



is arranged to grip the top flange of the beam for movement during punching operation. Rolls and roll shafts are mounted in self-aligning antifriction bearings and spacing table carriage is likewise equipped.

14. Valve Grinder

Valves with face angles 0 to 62½-degrees and face diameters of 7/16 to 3½-in. may be ground with the new type H valve grinder introduced by Landis



Tool Co., Waynesboro, Pa. The Microsphere bearing headstock uses collets or V-blocks for chucking and clamps hydraulically. Loading and unloading may be done with the headstock spindle rotating, or it may be cycled to stop when grinding is completed.

Wheel spindle is also mounted in Microsphere bearings. Reciprocating movement is adjustable from 0 to 5/8-in. Standard wheel size is 1 x 8 x 20 in. Wheel drive motor is 3 hp. Capacity of hydraulic oil reservoir is 32 gal, and coolant reservoir 42 gal.

FOR MORE INFORMATION

on products and equipment described in this section, fill in a card following page 150.

15. Small Production Furnace

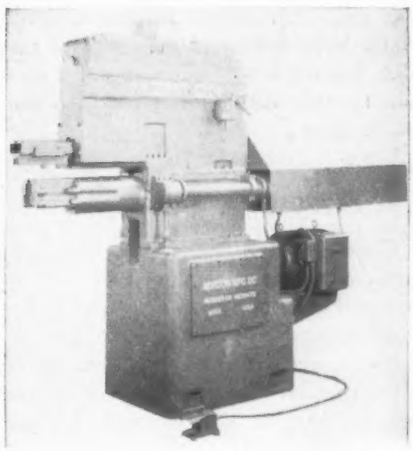
Automatic temperature controls maintaining any desired temperature automatically between 250 and 1900°F in the new medium-size laboratory furnace, built by K. H. Huppert Co., Chicago.

Furnace heating unit consumes 2000

w at 110 v ac. It is constructed of heavy gage steel with multilayered insulation. Inside dimensions are 6 x 6 x 6 in., with a 3¼-in. throat additional. Overall dimensions of the furnace, known as model 9A deluxe, are 19 x 20½ x 2¼-in.

16. Flash Trimming Machine

Operating on an automatic cycle, the flash trimming machine built by Morton Mfg. Co., Muskegon Heights, Mich., is arranged for removing the flash or upset from resistance or butt welds. Available



in sizes ranging from 12 to 28 in. trimming capacity and 1/4-in. metal thickness, it has an operating distance approximating 55 in. from center of rams to floor.

Machine is arranged with lower horn for circular work. Each ram is provided with three or more tool holders,

depending on material thickness and analysis. The machine is furnished to handle either cylinders, rectangular or flat work up to 3/4-in. maximum thickness.

17. Circuit Breaker

Quicklag circuit breakers, tripping action of which combines inverse time limit characteristics of bimetal thermal action on overloads with operating speed of magnetic trip action on short circuits, are announced by Westinghouse Electric Corp., Pittsburgh. Available in single or double pole, 10 to 50 amp, 125 to 125/250 ac, each breaker is provided with a de-ion arc chute that eliminates need for a vent screen in the bottom, thereby permitting mounting flush to pan.

Other features include: Sturdy operating handle; internal design requiring slight handle movement; more satisfactory method of attaching handle extension for two-pole operation; and smooth flush surface to eliminate dust traps.

18. Fly Ash Collector

C. C. Hermann & Associates, 5731 Somerset drive, Detroit 24, announces a cupola fly ash collector for use on all sizes of cupolas to remove cinders, fly ash and dust, also to quench sparks and flame exhausted by foundry cupolas. Equipment is essentially a water-cooled cap concentric with a steel cylinder, open at top and adapted to fit over top of the cupola stack.

Water at low head is pumped to unit flowing upward through water jacket and gushing out circular opening in top plate at apex of cone. Curved vanes secured to top plate serve to distribute water evenly over entire top surface, keeping it clean. Water flows downward over edge of the plate forming a very effective water curtain through which the gases from the cupola must pass.

19. Crane Door

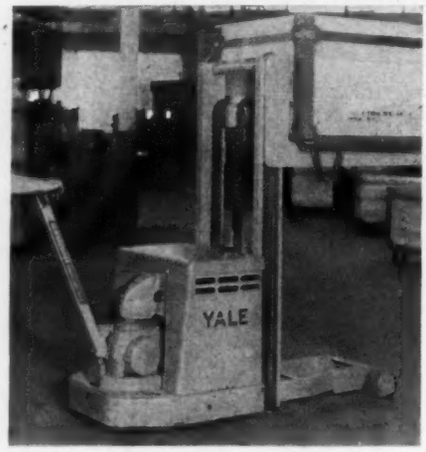
Closing of large and small swing type crane doors is accomplished by use of powered closing arms developed by Fleming Steel Co., New Castle, Pa. A series of mechanical and electrical interlocks are provided to insure that misuse will not interfere with or cause damage to the components, in the proper operation of the door.

Door swings up and opens to allow free travel of the crane between the plant and the yard and, when closed, provides a weathered closure which retains the heat in the building.

In operation, lower door slides to right where it engages a combination interlock. This unlatches upper door which is then swung up into open position by means of six heavy duty cables. In closing all operations are automatically reversed and the power closing arms force the upper leaf fully closed where it engages another combination interlock releasing the lower door and permitting it to slide to the left and close.

20. Electric Hand Truck

Fully-powered hand truck that uses electrical energy to lift the load as well as propel the truck is announced by Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia 24. Known as the Yale



high-lift platform model Worksaver, it lifts loads to considerable heights from the floor for stacking and servicing elevated docks, racks or tailgates.

The company offers the truck in two models: One with a platform which can get under a 7-in. skid and hoist it to a height of 66½-in.; the other with a platform that can get under a 11-in. skid and lift it to a height of 70½-in. Both models are capable of lifting 4000 lb. Trucks can swing in a radius of 95 in., and can negotiate a grade of 9 per cent.

21. Pushbutton Units

Oiltight pushbutton units, selector switches, and indicating lights designed for machine tool and automotive industries are announced by General Electric Co., Schenectady, N. Y.

Momentary-contact pushbutton units are available in several forms: Single-pole unit for normally-open and normally-closed circuit; three-point unit for two normally-open circuits with common connection; and double-pole units with either normally-open or normally-closed type circuits.

All contacts are double-break, and made of silver. Selector switch unit is made in single-pole double-throw, or double-pole single-throw forms. Indicating light unit has same single-pole mounting arrangement as the pushbutton units and selector switches. All are for use on 110-125 or 250 v, ac or dc.

22. OXYGEN BREATHING UNIT

A self-contained oxygen breathing apparatus in which the wearer is independent of outside air for a minimum of 45 min is announced by Mine Safety Appliances Co., Pittsburgh 8. Generating its own oxygen for the wearer with a replaceable canister, apparatus weighs 13 1/2-lb.

23. VIBRATION ABSORBING PAD

MB Mfg. Co. Inc., New Haven 11, Conn., announces Isomode pads of live, oil-resistant neoprene, for use under all types of machinery as mounting pads and vibration absorbers. They may be used on uneven floors without shims. The pads measure 18 in. square and 5/16-in. thick, and can be cut to any size or shape desired.

24. SOLENOID

A solenoid consisting of five components parts—base armature, coil, coil locks and back stops—is announced by Practical Electric Co., 4505 Oakwood boulevard, Melvindale, Mich. Solenoid may be completely disassembled and coil replaced by removing only the two screws which hold back stop in place. Current required to maintain magnetic circuit is small, preventing harmful temperature rise.

25. SPRING PLUNGERS

Made by Vlier Mfg. Co., 4552 Beverly boulevard, Los Angeles 4, spring plungers and stops may be used to break the oil seal and act as a locating pin on dies, as locating and tooling pins for major assembly fixtures, holding parts against permanent fixtures, neutral positioning of pedals or levers, etc. Plungers have long plunger bearing, free action and exert uniform pressure. Units are made in sizes from ⅝ to 2¼-in. in length, with various threads, plunger lengths and end pressures from 5 to 35 lb.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Steel Labor Trouble Feared As Wage Negotiations Stall

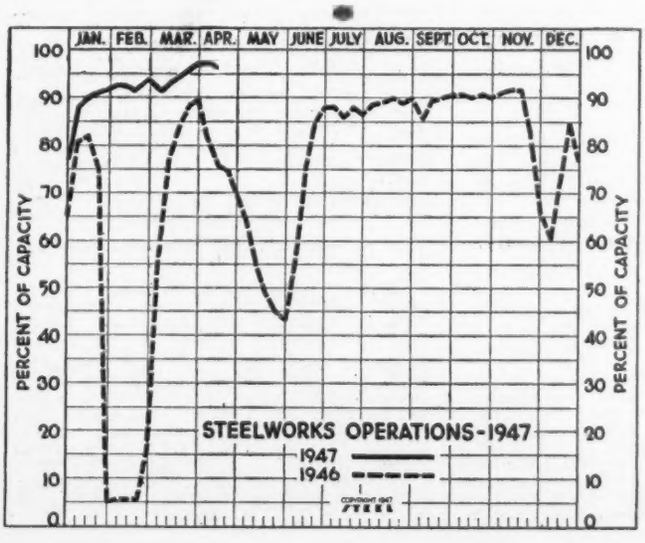
Strike talk increases as expiration date of extended wage agreement nears. Union policy expected to be determined at Pittsburgh meeting. Industry continues under pressure for lower prices

OPTIMISM is less buoyant in the iron and steel industry. Steelmaking operations are holding well in the face of curtailed coal supplies and demand shows no sign of abating, but the immediate future outlook in the industry is clouded by threat of serious labor trouble in the offing. And President Truman's attitude with respect to wages and prices, as expressed in a press conference last week, was anything but reassuring of labor peace.

Current coal mine stoppage appears to be petering out, although the ominous threat of widespread shutdown of furnaces for lack of fuel continues. Even though the coal barrier is hurdled prospects for continued high steel production over the remainder of the year are darkened by lack of progress in working out a new steel wage contract.

Negotiations between U. S. Steel Corp. subsidiaries and the United Steelworkers of America have virtually slowed to a walk, and talk of a strike when the present contract extension expires Apr. 30 is being bandied about alarmingly. Chances are still good there will be no widespread steel walkout, however. For that matter, the view is advanced in some quarters that in event an agreement is not reached on a wage contract, the union may strike only U. S. Steel plants, extending existing contracts with other producers temporarily. This, of course, is pure speculation since, so far as is known, union policy will not be determined until top union leaders meet next week.

Government officials continue to press for lower prices and the heat has not been taken off the steel industry despite the statement of Benjamin Fairless, U. S. Steel president, that consideration of price policy must await settlement of the wage question. Whether the psychological pressure on industry for price reductions being exerted by government officials, including President Truman, will be effective remains to be seen. Some market opinion leans to the view a token cut of $1 to $2 per ton in base steel prices may be forthcoming, especially should first quarter data show steel earnings substantially above those in the last quarter of 1946. This view applies to the near-term. For the long-term it is generally felt competitive forces will begin to whack at the steel price structure later in the year when supply and demand come into balance. This, it is said, should begin to show up in some products late in the summer. At the moment the only price action in iron and steel involves revision of extra cards to conform with changes recently initiated.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended April 12	Change	Same Week 1946	Same Week 1945
Pittsburgh	101	+ 0.5	69	88.5
Chicago	95.5	+ 0.5	74.5	98.5
Eastern Pa.	90.5	None	84	94
Youngstown	86	— 5	70	91
Wheeling	93.5	None	86	93.5
Cleveland	96	None	94.5	88.5
Buffalo	88.5	None	90.5	90.5
Birmingham	99	None	85	95
New England	94	None	88	90
Cincinnati	92	None	79	89
St. Louis	75	None	54	80
Detroit	90	None	88	90
Estimated national rate	96.5	— 0.5	75.5	94.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Scrap prices are easing off at various consuming points. However, the market, for the moment, appears to be in an indecisive position with buying by the steel mills at a virtual standstill.

Steel production was record-breaking for peacetime during first quarter. Output totaled 20,919,055 tons, almost double production in the first three months of 1946. March output at 7,284,516 also set a peacetime record. Sustained operations at the March rate over the remainder of 1947 would result in an output this year of approximately 85 million tons of ingots, which would be 19 million tons more than were produced in 1946.

Ingot operations held up surprisingly well last week in the face of curtailed fuel supply, the estimated national rate easing only ½ point to 96.5 per cent of capacity. This decline was due to a drop of five points to 86 per cent at Youngstown where the mills are particularly short of coal and coke. Operations went up ½ point at Chicago and Pittsburgh to 95.5 per cent and 101 per cent, respectively.

STEEL's composite price average last week eased further on steelmaking scrap to $34.92 from $35.58. The finished steel composite held unchanged at $69.82, as did that on semifinished steel at $52.10, and that on steelmaking pig iron at $32.49.

COMPOSITE MARKET AVERAGES

	Apr. 12	Apr. 5	Mar. 29	One Month Ago Mar., 1947	Three Months Ago Jan., 1947	One Year Ago Apr., 1946	Five Years Ago Apr., 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.53	$63.54	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	49.45	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	31.85	29.56	25.50	23.00
Steelmaking Scrap	34.92	35.58	37.50	36.67	31.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	April 12, 1947	Mar., 1947	Jan., 1947	Apr., 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.82
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.462	2.35
Shapes, Philadelphia	2.64	2.64	2.602	2.465
Shapes, Chicago	2.50	2.50	2.462	2.35
Plates, Pittsburgh	2.65	2.65	2.612	2.50
Plates, Philadelphia	2.85	2.85	2.777	2.55
Plates, Chicago	2.65	2.65	2.612	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.062	3.25
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$47.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	41.25	39.00
Rerolling billets, Pittsburgh	42.00	42.00	41.25	39.00
Wire rods ⅜ to ¼-inch, Pitts.	2.675c	2.675c	2.675c	‡2.30c

‡ Base, No. 5 to ⅜-in.

Pig Iron

	April 12, 1947	Mar., 1947	Jan., 1947	Apr., 1946
Bessemer, del. Pittsburgh	$34.83	$34.83	$31.815	$27.69
Basic, Valley	33.00	33.00	30.00	26.00
Basic, eastern del. Philadelphia	35.52	34.26	31.99	27.84
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	31.315	27.19
No. 2 fdry., del. Philadelphia	36.02	34.76	32.49	28.34
No. 2 foundry, Chicago	33.00	32.50	30.50	26.50
Southern No. 2 Birmingham	29.88	29.28	26.88	26.94
Southern No. 2, del. Cincinnati	34.75	34.15	31.75	28.34
Malleable, Valley	33.50	33.50	30.50	26.50
Malleable, Chicago	33.50	32.90	30.50	26.50
Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50	37.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	30.65	26.55
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.00	140.00

Scrap

Heavy melting steel, No. 1, Pittsburg	$38.00	$36.80	$32.50	$20.00
Heavy melt. steel, No. 2, E. Pa.	34.00	38.50	31.00	18.75
Heavy melt. steel, Chicago	32.75	34.60	30.00	18.75
Rails for rerolling, Chicago	39.00	40.30	35.69	22.25
No. 1 cast, Chicago	42.50	43.10	41.25	20.00

Coke

Connellsville, furnace ovens	$9.125	$8.875	$8.812	$7.50
Connellsville, foundry ovens	10.375	10.375	9.812	8.25
Chicago, by-product fdry., del.	16.10	16.10	15.912	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, ⅜ to ¼-in., inclusive $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birminbham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, corrugated: Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52. 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $13.50; 15-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)
Floor Plates: Pittsburgh, Chicago, 3.90c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.
Clad Steel Plates: Coatesville, 10% cladding: nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del.), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, Bethlehem, Pa., equivalent.)
Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.30-$3.55
Spring (except Birmingham)	**$4.25

Wire Products to Trade

Nails and Staples

Standard and cement-coated	†$3.75-$4.50
Galvanized	‡$3.75-$4.50
Wire, Merchant Quality	
Annealed (6 to 8 base)	§$3.95
Galvanized (6 to 8 base)	§$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)	
Woven fence, 15 gage and heavier	††84
Barbed wire, 80-rod spool	††94
Barbless wire, twisted	94
Fence posts (no clamps)	††82
Bale ties, single loop	††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.
** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28, black premier.
† Worcester $4.05, Cleveland $3.85, base. San Francisco (base del.) $4.83.
‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.
†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), $2.95, Williamsport, Pa.
Relaying, 60 lb and over, fob railroad and basing point, $46-$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

In.	Steel Blk.	Steel Gal.	In.	Iron Blk.	Iron Gal.
⅛	48	23	½	— 2	+20
¼ & ⅜	51	30½	¾	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

In.	Steel Blk.	Steel Gal.	In.	Iron Blk.	Iron Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless

In.	Steel Blk.	Steel Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	55 off
⅝ and ⅞, up to 6 in. in length	52 off
¾ x 6 in.	49 off
⅞ and 1 in. x 6 in. length	51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in.	48 off
½ in. and smaller, longer than 6 in.	45 off
Tire bolts	38½ off
Step bolts	46 off
Plow bolts	57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	51 off	....
½-in. and smaller	....	48 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
⅞-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	67.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	33.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	36.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†Neville Island, Pa., base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., Del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	....	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O., del.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base).....$40.50
6.51-7.00..$41.50 9.01- 9.50. 46.50
7.01-7.50.. 42.50 9.51-10.00. 47.50
7.51-8.00.. 43.50 10.01-10.50. 48.50
8.01-8.50.. 44.50 10.51-11.00. 49.50
8.51-9.00.. 45.50 11.01-11.50. 50.50

Fob Jackson, O., per gross ton, Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $52.75, Jackson, O.; $56 Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace..	*$8.75–$9.50
Connellsville, foundry..	9.75–11.00
New River, foundry...	12.50
Wise county, foundry..	11.15
Wise county, furnace..	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$10.10.

By-Product Foundry

Kearney, N. J., ovens.	$15.35
Chicago, outside del..	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, del.	12.35
Indianapolis, ovens....	14.50
Cincinnati, del.	15.35
Ironton, O., ovens....	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	14.50
Portsmouth, O., ovens.	14.00
Fairmount, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coke By-Products

Spot, gal, freight allowed east of Omaha

Pure and 90% benzol	17.00c
Toluol, two degrees	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Malleable Bung Brick

All bases	80.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	24.00
Single bags	28.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	14.00

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Wolframite, per short ton unit, duty paid	$24–$25

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	3.85	3.75–3.85	...	...	...
Cold-Rolled	4.55–4.75	4.55–4.75	4.55–4.75	4.75	...	4.55–4.75	...	...	...
Galvanized	5.40	.....	.....	...	...	.....	...	...	...
Strip, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp., Detroit.

WAREHOUSE STEEL PRICES

Base prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	C-R	H-R	C-F	H-R Alloy (§4140)	Structural Shapes	Carbon ¼"-¾"	Floor ¾" & Thicker
Boston (city)	4.50	....	5.22[4]	6.80[4]	6.80[4]	4.65	6.36	4.62	5.47	7.12	4.47	4.80	6.42
††New York (city)	4.42	....	5.27[4]	5.47[5]	....	4.62	....	4.62	5.42	8.42[13]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[3]	5.37[5]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.24	5.73[3]	5.33[3]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.38	6.87	4.22	4.44	5.93
Philadelphia (country)	4.14	5.63[3]	5.23[3]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.34	5.83
Baltimore (city)	4.09	6.15[3]	5.65[3]	5.14[5]	6.39[5]	4.40	....	4.45	5.35	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[3]	5.55[3]	....	....	....	....	....	4.85	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.00	....	4.70[3]	4.35[5]	....	4.30	4.95	4.05	4.95	....	4.05	4.60	5.90
Buffalo (country)	3.90	....	4.60[3]	4.95[5]	....	3.90	4.60	3.95	4.85	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.00	5.15[3]	4.70[3]	5.05[5]	6.30[5]	4.00	4.95	4.05	4.95	6.60	4.05	4.30	5.55
Pittsburgh (country)	3.90	5.05[3]	4.60[3]	4.95[5]	6.20[5]	3.90	4.85	3.95	4.85	6.60	3.95	4.20	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	5.12[13]	7.01	4.42	4.59	5.92
Cleveland (city)	4.05	5.20[3]	4.75[3]	5.238[5]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	3.90	5.05[3]	4.60[3]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.116	5.266[3]	....	5.166[5]	....	4.394	....	4.403	5.303	....	4.444	4.653	5.944
Chicago (city)	4.00	5.15[3]	4.70[3]	5.05[5]	6.30[5]	4.00	5.05	4.05	4.95	6.60	4.05	4.30	5.70
Chicago (country)	3.90	5.05[3]	4.60[3]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.85	6.60	3.95	4.20	5.60
Milwaukee	4.199	5.349[3]	4.899[3]	5.249[5]	6.499[5]	4.199	5.249	4.249	5.149	6.899	4.249	4.499	5.899
St. Paul	4.384[1]	5.534[3]	5.084[3]	5.434[5]	6.684[5]	4.404[13]	....	4.434[13]	5.726[13]	7.084[13]	4.434[13]	4.684[13]	6.084[13]
Indianapolis	4.04	....	4.84[3]	5.29[5]	6.54[5]	4.24	....	4.361‡	5.26	....	4.36	4.61	6.01
St. Louis	4.199	....	4.899[3]	....	6.674[5]	4.199	....	4.249	5.324[13]	7.074	3.999	3.999	5.999
Birmingham (city)	3.85[20]	....	....	5.20[5]	....	4.10[20]	....	4.05[20]	5.83	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.46°°	....	5.77[3]	....	....	4.83[20]	....	4.78°°	6.14[11]	....	4.68°°	4.83[20]	6.94[20]
Houston, Tex.	4.50[1]	....	....	....	6.00[12]	5.80[1]	....	°°°	....	....	....	5.60	6.40
Omaha, Nebr.	4.868	6.118[3]	....	5.918[5]	7.168[5]	4.862	....	4.918	5.81[8]11	....	4.918	5.168	6.568
Los Angeles	5.55	....	7.10[3]	....	8.10[5]	5.65	8.35	5.10	6.90[19]	7.85	5.20	5.20	7.20
San Francisco	4.90§§	....	6.30[3]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	°°°	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]
Seattle	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 to 39,999 pounds; cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 49,999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]1500 to 39,999; [20]—400 to 3999 pounds.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; °°° rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco; bar size angles, flats, rounds 5.00c, squares and half ovals 5.15c and bar size channels 5.55c at Houston.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44; Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.10; contract, $2.08; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 13.40c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c, 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium-Silicon: (Ca 30-35%, Si

60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 14.10c; 2000 lb to c.l. 15.60c; central 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max, Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5 (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Zr 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.80, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Metal Prices Hold Steady

Consumers concerned regarding copper supplies . . . Lead and zinc output continues to increase

NEW YORK — Consumers of copper are becoming increasingly alarmed over the supply outlook, especially in view of the advance in foreign prices which will tend to diminish the benefits of the suspension in the import tariff if that is ordered by the government. At the same time, lead and zinc supply is improving on the largest production recorded since 1945.

COPPER—Office of Metals Reserve has started releasing metal from its remaining limited stockpile of government-owned foreign copper. After apportioning about 28,000 tons during March to domestic consumers, it is estimated the agency has only 40,000 tons left, some of which is not scheduled to arrive in this country from South America until sometime in May and, hence, will not be available to consumers here this month.

Domestic users will have to depend upon private buying of foreign produced metal when the government stockpile is exhausted. About 25,000 tons of foreign copper will be available monthly to domestic manufacturers, if Congress acts favorably on the suspension of the 4-cent copper import tax. Since there is not expected to be much more than 80,000 tons of copper a month available from domestic mines and custom smelters, the total supply should aggregate around 105,000 tons per month. At the close of last week foreign copper was 24.64c a pound, exclusive of duty, compared with the domestic price of 21.50c, Connecticut, for electrolytic. With a price level abroad several cents higher than the American price, it appears unlikely that any substantial tonnage will seek market in this country over the foreign bids.

The shortage of supply not only threatens a drastic curtailment of production of durable goods and of capital expansion of the larger corporations in the electrical, motor vehicle, communications and other large copper consuming industries, but it also threatens drastic curtailment or complete cessation of operations by scores of smaller fabricators of copper and brass products.

BRASS INGOTS—Reflecting the advance of 10 cents a pound in the price of tin, which became effective Apr. 2, brass and bronze ingot makers made upward revisions in their selling prices on all 88-10-2 group ingots, ranging from ¼-cent to 2 cents, and on 80-10-10 group ingots from No. 295 through No. 321, ranging from ½-cent to 1.50 cents. Other ingot prices held unchanged.

LEAD—Average daily rate of lead production from domestic mines increased to 1055 tons in February, the highest level reached since November, 1945, according to the Bureau of Mines. This compared with a rate of 1015 tons in January. Due to the shorter month, however, total output came to 29,546 tons compared with 31,476 tons in February. American Smelting & Refining Co. has been booking business for May delivery on the basis of 15.00c, New York, and 14.85c, East St. Louis. Another large seller, however, has not yet officially opened the books for that month. St. Joseph Lead Co. continues to quote 15.00c, New York, and 14.80c, East St. Louis.

ZINC — Smelter production of zinc increased in March to 75,376 tons, largest output to be reported in nearly three years and representing an increase of about 10,200 tons over February and 3000 tons over January's total. On a daily basis, output was at a rate of 2431 tons, the highest since June, 1944, when it was 2436 tons. Shipments to domestic consumers held steady at 68,983 tons while export and drawback shipments dropped to 6805 tons from 10,718 tons in January. As smelter production and total deliveries were virtually in balance, the stocks at the end of the month held about unchanged at 162,049 tons. Unfilled orders on producers' books totaled 56,609 tons at the end of March as against 57,081 tons a month ago. Prices held unchanged on the basis of 10.50c, East St. Louis for prime western.

TIN — The Longhorn smelter turned out 2877 tons of tin in March, compared with 2815 tons in February and 3881 tons in March, 1946. This brought output for the first quarter to 8716 tons compared with 11,518 tons in the like 1946 period, a decrease of 2802 tons, or nearly 25 per cent. Stocks of pig tin in the government stockpile, which are available for sale, amounted to 16,502 tons as of Apr. 1 as compared with 19,059 tons on Mar. 1, a decrease of 2557 tons. Assuming that the Longhorn production will continue at about 2900 tons in a month, the monthly receipts of imported pig tin will have to total around 2500 tons in order to balance incoming supplies with the outgo under present allocations. Prices held at 80.00c, New York.

ALUMINUM — Total production of aluminum in the United States in 1946 was 409,630 tons, or 2½ times the amount produced in any year prior to 1940, but well under total demand. Prices are firm at 15.00c, delivered, for 99 per cent plus grade.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 21.25c, refinery, 20,000 lb or more; 21.50, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 21.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 25.25c; No. 1 yellow (No. 405) 17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.50c; No. 12 foundry alloy (No. 2 grade) 15.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.00c; grade 2 (92-95%) 15.00c; grade 3 (90-92%) 14.25c; grade 4 (85-90%) 13.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlot; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c, 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $86-$90 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 76.00c per ounce.

Platinum: $57-$61 per ounce.

Palladium: $24 per troy ounce.

Iridium: $85-$95 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over, 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz balls, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 30,000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c, 500 to 1000 lb, 95.25c, 200 to 500 lb, 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 9999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00c, No. 2 copper 17.00, light copper 16.00, composition red brass 16.75, auto radiators 13.25, heavy yellow brass 12.00, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.50; No. 2 copper, 18.50, light copper 17.50; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.50-16.00; light copper 14.25-14.75; No. 1 composition red brass 14.25-14.50, No. 1 composition turnings 14.00-14.25, mixed brass turnings 9.75-10.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 11.75-12.25, light brass 8.50-9.00, heavy yellow brass 9.75-10.00, new brass rod ends 12.00-12.50, auto radiators, unsweated 11.50-12.00, clean red car boxes 12.50-13.00, cocks and faucets 11.25-11.50, brass pipe 11.00-11.50.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linotype and stereotype 13.50-14.00, electrotype 11.50-12.00, mixed babbitt 13.50-14.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 9.00-9.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00, pistons, free of struts, 6.75-7.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH:

Prices for open hearth grades (against old orders) from remote points range from $38 to $40; on electric furnace grades, $44 to $45, depending on freight. Prices for all steelmaking grades, both for local and remote material, temporarily nominal.

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1, 2 & 3 Bundles.	38.00
Machine Shop Turnings	30.00-31.00
Mixed Borings, Turnings	30.00-31.00
Short Shovel Turnings.	32.00-33.00
Cast Iron Borings	31.00-32.00
Bar Crops and Plate	44.00-45.00
Low Phos. Cast Steel	43.00-44.00
Punchings & Plate Scrap	44.00-45.00
Elec. Furnace Bundles.	43.00-44.00
Heavy Turnings	37.00-38.00
Alloy Free Turnings	33.50-34.50
Cut Structurals	44.00-45.00
No. 1 Chemical Borings	34.50-36.50

Cast Iron Grades

No. 1 Cupola	43.50-44.50
Charging Box Cast	39.00-39.50
Heavy Breakable Cast.	37.50-38.50
Stove Plate	42.00-43.00
Unstripped Motor Blocks	42.00-43.00
Malleable	46.00-47.00
Brake Shoes	35.00-36.00
Clean Auto Cast	43.50-44.50
No. 1 Wheels	45.00-46.00
Burnt Cast	35.00-36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	48.00-49.00
Axles	44.00-45.00
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	38.00-39.00
Rails, 3 ft and under	42.00-43.00
Rails, 18 in. and under.	45.00-46.00
Railroad Specialties	44.00-45.00
Uncut Tires	44.00-45.00
Angles, Splice Bars	42.00-43.00

CLEVELAND:

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 2 Heavy Melt. Steel	34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Bar Crops and Plate	37.00-37.50
Cast Steel	37.00-37.50
Punchings & Plate Scrap	37.00-37.50
Elec. Furnace Bundles.	35.50-36.00
Heavy Turnings	34.00-34.50
Alloy Free Turnings	30.00-30.50
Cut Structurals	40.00-45.00

Cast Iron Grades

No. 1 Cupola	45.00-48.00
Charging Box Cast	42.00
Stove Plate	44.00
Heavy Breakable Cast.	42.00-44.00
Unstripped Motor Blocks	40.00-44.00
Malleable	57.00-58.00
Brake Shoes	43.00
Clean Auto Cast	48.00
No. 1 Wheels	43.00
Burnt Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.50-38.00
R.R. Malleable	57.00-58.00
Rails, Rerolling	46.00-48.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	48.00
Railroad Specialties	45.00
Uncut Tires	44.00
Angles, Splice Bars	46.50-47.50

VALLEY

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 2 Heavy Melt. Steel	35.00-35.50
No. 1 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Short Shovel Turnings.	30.50-31.00
Cast Iron Borings	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00

MANSFIELD:

No. 1 Heavy Melt. Steel	$35.00-35.50
Machine Shop Turnings	29.00-29.50
Short Shovel Turnings.	30.50-31.00

CINCINNATI

No. 1 Heavy Melt. Steel	$33.00
No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	33.00
No. 1 Bundles	33.00
No. 2 Bundles	33.00
Machine Shop Turnings.	26.00
Mixed Borings, Turnings	24.00
Short Shovel Turnings.	27.00
Cast Iron Borings	27.00

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	35.00
Heavy Breakable Cast.	37.00
Stove Plate	33.00
Unstripped Motor Blocks	34.00
Brake Shoes	32.00
Clean Auto Cast	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	36.00
R.R. Malleable	46.00
Rails, Rerolling	39.00
Rails, Random Lengths	39.00
Rails, 18 in. and under.	46.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$32.00-32.50
No. 1 Busheling	32.00-32.50
Nos. 1 & 2 Bundles	32.00-32.50
No. 3 Bundles	32.00-32.50
Machine Shop Turnings	25.00-25.50
Mixed Borings, Turnings	25.00-25.50
Short Shovel Turnings.	26.00-26.50
Cast Iron Borings	26.00-26.50
Punchings & Plate Scrap	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-40.00
Heavy Breakable Cast.	30.00-31.00
Clean Auto Cast	38.00-40.00

BUFFALO:

No. 1 Heavy Melt. Steel	$35.00-37.00
No. 2 Heavy Melt. Steel	35.00-37.00
No. 1 Busheling	35.00-37.00
Nos. 1 & 2 Bundles	35.00-37.00
Machine Shop Turnings	25.00-26.00
Mixed Borings, Turnings	25.00-26.00
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	24.00-25.00
Punchings & Plate Scrap	34.00-35.00
Elec. Furnace Bundles.	33.00-38.00
Alloy Free Turnings	30.00-31.00

Cast Iron Grades

Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	37.00-38.00
Stove Plate	43.00-44.00
Malleable	40.00-41.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00-39.00

PHILADELPHIA:

No. 1 Heavy Melt. Steel	$34.00
No. 2 Heavy Melt. Steel	34.00
No. 1 Busheling	34.00
No. 1 Bundles	34.00
No. 2 Bundles	33.00-34.00
No. 3 Bundles	32.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	23.00
Short Shovel Turnings	26.00
Bar Crops and Plate	37.00-38.00
Punchings & Plate Scrap	37.00-38.00
Elec. Furnace Bundles.	35.00-36.00
Heavy Turnings	33.00-34.00
Cut Structurals	37.00-38.00
No. 1 Chemical Borings	31.50-32.00

Cast Iron Grades

No. 1 Cupola Cast	48.00-49.00
Charging Box Cast	46.00-46.50
Heavy Breakable Cast.	44.00-45.00
Unstripped Motor Blocks	44.00-45.00
Malleable	48.00-49.00
Clean Auto Cast	48.00
No. 1 Wheels	46.00-48.00

NEW YORK:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$32.00-33.00
No. 2 Heavy Melt. Steel	32.00-33.00
No. 1 Busheling	32.00-33.00
Nos. 1 & 2 Bundles	32.00-33.00
No. 3 Bundles	30.00-31.00
Machine Shop Turnings.	21.00-22.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings.	23.50
Punchings & Plate Scrap	32.00-34.00
Elec. Furnace Bundles.	31.50
Cut Structurals	32.00-34.00
No. 1 Chemical Borings	25.00

Cast Iron Grades

No. 1 Cupola Cast	41.00-42.00
Charging Box Cast	40.50-41.00
Unstripped Motor Blocks	41.50-42.00
Malleable	48.00-49.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$28.00-29.00
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Busheling	26.00-28.00
Nos. 1 & 2 Bundles	28.00-29.00
Machine Shop Turnings	20.00-21.50
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings.	22.00-23.00
Bar Crops and Plate	31.00-32.00
Punchings & Plate Scrap	31.00-32.00
Chemical Borings	22.00-23.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Charging Box Cast	40.00-42.00
Heavy Breakable Cast.	42.00-44.00
Stove Plate	39.00-40.00
Unstripped Motor Blocks	37.50-39.50
Clean Auto Cast	44.00-46.00

CHICAGO

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	32.50-33.00
Nos. 1 & 2 Bundles	32.50-33.00
No. 3 Bundles	30.50-31.00
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings.	28.00-30.00
Cast Iron Borings	28.00-29.00
Bar Crops and Plate	35.00-35.50
Cast Steel	35.00-35.50
Punchings	35.00-35.50
Elec. Furnace Bundles.	33.50-34.00
Heavy Turnings	32.00-32.50
Cut Structurals	34.50-35.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-45.00
Malleable	40.00-45.00
Clean Auto Cast	40.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.50-34.00
Rails, Rerolling	38.00-40.00
Rails, Random Lengths	36.00-38.00
Rails, 3 ft. and under	41.00-43.00
Rails, 18 in. and under	42.00-44.00
Railroad Specialties	39.00-41.00
Angles, Splice Bars	39.00-41.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$32.50-33.50
No. 2 Heavy Melt. Steel	32.50-33.50
Machine Shop Turnings	26.00-26.50
Short Shovel Turnings.	28.00-29.25

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	37.00
Heavy Breakable Cast.	39.00
Stove Plate	29.00-34.00
Brake Shoes	28.75-31.00
Clean Auto Cast	35.00-37.00
No. 1 Wheels	38.00
Burnt Cast	22.50-25.00

Railroad Scrap

R.R. Malleable	41.00-42.00
Rails, Rerolling	38.00
Rails, Random Lengths	36.00
Rails, 3 ft and under	40.00-43.00
Uncut Tires	34.50-36.50
Angles, Splice Bars	38.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$33.00
No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	33.00
Nos. 1 & 2 Bundles	33.00
Long Turnings	23.00
Short Shovel Turnings.	25.00
Cast Iron Borings	24.00
Bar Crops and Plate	36.00-37.00
Punchings & Plate Scrap	36.00-37.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Stove Plate	37.00-38.00
No. 1 Wheels	33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
R.R. Malleable	37.50-38.00
Axles, Steel	33.00
Rails, Rerolling	39.00-40.00
Rails, Random Length.	33.00-34.00
Rails, 3 ft and under	36.00-37.00
Angles and Splice Bars	37.00-38.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths.	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	25.50
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	11.00
Mixed Borings, Turnings	11.00
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles.	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

LOGEMANN

Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

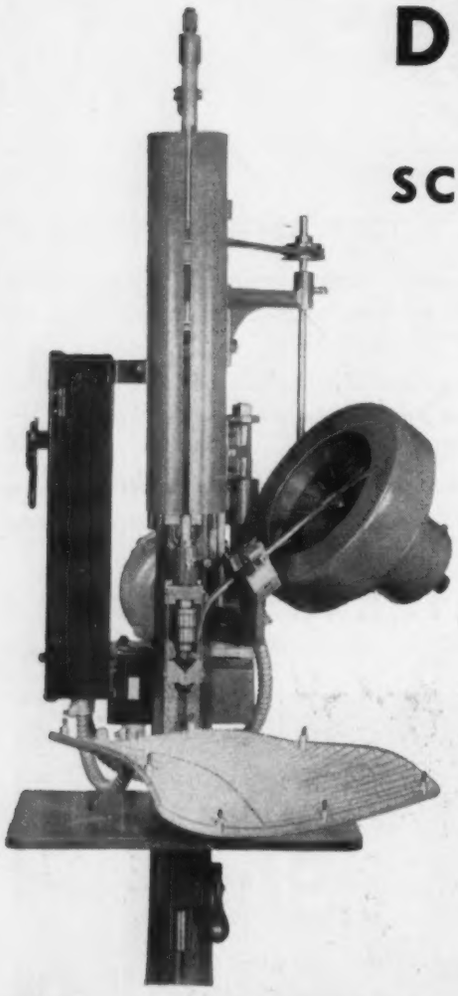
LOGEMANN BROTHERS COMPANY
3126 W. Burleigh St. **Milwaukee, Wisconsin**

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

A MODERN WAY OF DRIVING STUDS

by using

DETROIT —*Power*— SCREWDRIVERS



Hopper-feeding eliminates the handling of studs . . . . Machine is equipped with Titan or Modern stud-setters . . . Machine will drive up to ¼ inch diameter studs in lengths up to 1¼ inches in untapped holes in die castings or tapped holes in steel.

Illustration shows studs being driven in automobile grille, all to uniform height in untapped holes.

Motorized HOPPER UNITS

Speedy Sturdy Dependable

USED WITH:

Presses, Centerless Grinders, Thread Rolling and Slotting Machines, or Special Machine. Made in 4 diameters, 10", 12", 16" and 24".

FEED:

Screws, Screw Blanks, Rivets, Pins, Discs, Nuts, Bearing Rollers, Steel Balls, Washers.

MADE IN 4 DIAMETERS: 10', 12', 16', 24'

Send Samples for Details and Prices

DETROIT POWER SCREWDRIVER CO.

2811 W. Fort Street
DETROIT 16, MICH.

Sheets, Strip . . .

Carnegie-Illinois reverts to $4.70 base on hot-rolled alloy strip; revises extras

Sheet Prices, Page 154

Pittsburgh—New hot-rolled alloy strip extra card, issued Apr. 10 by Carnegie-Illinois Steel Corp. closely follows the extra schedule published by Sharon Steel Corp. Jan. 10. Carnegie has reverted to former price base of $4.70 per 100 pounds on hot-rolled alloy strip (in effect prior to the 8.2 per cent increase applicable on base price and extras granted under OPA) and, as in case of Sharon Steel, has substantially advanced most grade classifications, although in a few instances reductions are noted. Quantity, straightening, and packaging extras also are revised in line with those announced by Sharon Steel. The table illustrating new standard classification by size of flat rolled alloy steel is significant. The bar classification is restricted up to 6 inches, inclusive, in width in thickness 0.2031-inch and thicker. Spring flats are limited in widths 1 7/16 to 6 inches, inclusive, in thickness 0.171-inch and thicker.

In widths over 48 inches, plate classification is restricted to 0.1800-inch and thicker; sheets, 0.1799-inch and thinner. For widths 24 to 48-inch, inclusive, the thickness break between sheets and plates is 0.2300-inch; over 6 to 24-inch, exclusive, plates are classified 0.2300-inch and thicker; strip, 0.2299-inch to 0.0568-inch; sheets 0.0567-inch and thinner. In width range 6 to over 3½-inch, strip is classified for thickness 0.2030 to 0.0344-inch; sheets, 0.0343-inch and thinner. For widths 3½-inch and under, the strip classification is from 0.2030 thick to 0.0255; sheets, 0.0254 and thinner.

Formerly, the bar classification went up to 12 inches wide in thickness 0.2500-inch and heavier. In widths over 48-inches, the break between plates and sheets formerly was 0.1875-inch; in range 24 to 48-inches, plate classifications previously stopped at 0.2500-inch.

New York—Suspension of soft coal operations for another week will begin to make inroads on sheet production, which in turn will result in a revision in quarterly sales quotas. Because of this possibility, buyers are pressing harder than heretofore for tonnage scheduled for shipment over the next few weeks. Should the miners go back to work promptly, little if any loss in sheet tonnage likely would develop, leaving most consumers with hope of getting a little more tonnage than they received in the quarter just ended, providing, of course, a steel strike does not develop. If steel production could be sustained at the high rate of recent months on through the spring and summer, there should be a perceptible improvement in the delivery situation by fourth quarter. There would still be more demand than capacity and this would probably be true into next year.

Philadelphia — Stringency in sheets and strip continues pronounced, with consumers trying to obtain tonnage already due, rather than to place new tonnage. This action is stimulated by the unsettled situation in coal and by possibility of steel strike next month, although most trade interests are still hopeful.

Cincinnati—Steel mills are working

★ *Introducing Sandy McBuyer and his boys.*

The remarkable uniformity of gauge to which *MicroRold* is regularly produced means substantial economies to the fabricator. Manufacturers realize more parts or area per ton of steel plus noticeable reductions in die wear and breakage.

MicroRold Stainless Steels are produced in sheet and strip form up to 36 inches wide and in gauges from .004 to .078 inch in commercial grades, finishes, and tempers.

Copyrighted 1947 Washington Steel Corporation

WASHINGTON STEEL CORPORATION
WASHINGTON, PA.

U.S. AIR CONDITIONING COMPANY
OF MINNEAPOLIS, MINN.

...now saves 60% in cost and 50% in time

TECHNICAL SALES SERVICE REPORT

PROBLEM: To weld extremely thin brass fins to a ⅜" brass base plate, without warping and buckling due to heat of oxyacetylene flame.
SOLUTION: We recommended the use of Easy-Flo, a low temperature silver brazing alloy applied with the oxyacetylene flame. Because of Easy-Flo's low working temperature and exceptional fluidity and penetration, it proved ideal for the job. When used in combination with an easily made gas preheating furnace, it not only eliminated all distortion, but U. S. Air Conditioning Company now saves 60% in costs and 50% in time on this production job. The time required for balancing the fan was reduced to a minimum. In addition, the time and money lost in the straightening of the blower units was completely eliminated.

A. P. Demmer
Airco Technical Representative

Airco's Technical Sales Division is at the call of all industry in applying Airco processes and products in the solution of their problems. If you have a metal working problem, ask to have a Technical Sales Division man call. Address: Dept. S-5961, Air Reduction, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas.

AIR REDUCTION
Offices in All Principal Cities

TECHNICAL SALES SERVICE — ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

against second quarter commitments which represent full schedules. Unless there is an unexpected decline in output, the carryover should be slight. Steel supply, despite scarcities in raw materials, has been adequate to keep rolling equipment fully engaged. In one instance a modest tonnage of semifinished was diverted under a swap arrangement. No easing in demand for sheets is apparent.

Chicago — Although production of sheets and strip in this district has been at near capacity, no progress is being made in reducing accumulated commitments. Curtailment of coal mining has clouded the supply outlook. Neither does anyone know to what extent the accelerated freight car building program is going to affect quotas to customers. Farm implement makers and other seasonal users are pressing for deliveries. Demand for electrical sheet is expected to expand. Few customers have canceled or failed to specify against quotas, although all appear to be watching purchases more closely.

St. Louis—Sheet production continues to make limited headway against backlogs, but order books remain closed. Demand remained extremely heavy at the beginning of second quarter, augmented by CPA pressure for housing and railroad car steel which currently takes up a quarter of capacity. As a result, a few unfilled 1945 private orders remain on the books. Sheetmakers have made no reductions in price extras, although a $1 cut is contemplated when the national price structure is better established. Local producers made no change when most of the industry went up earlier in the year. Completion of a new cold roll mill this summer is expected to permit schedules to become current by September.

Steel Bars . . .

Bar Prices, Page 154

New York—Pressure for small sized hot carbon bars continues, especially in view of the uncertain outlook with regard to operations. Not only is there the present disturbing situation in the soft coal fields, but the general knowledge that wage negotiations in the steel industry are not progressing in the manner hoped for. The unsettled labor situation is also affecting the outlook in the large and medium sizes of hot carbon bars. Any important disruption in operations which may develop could check the easier trend in supply very quickly, it is pointed out; and this also could apply to cold-drawn carbon bars, supply of which recently has improved. One large cold drawer reports that within the past two weeks his delivery situation has eased in all specifications down to 3/16 inch. Meanwhile, supply of alloy bars remains easy with deliveries on hot alloys available in four weeks in most cases.

Philadelphia—Stringency in hot carbon bars continues to center on the small sizes. Medium sizes are still scarce, but supply is a shade easier. Cold drawn carbon continues in better supply, with some leading consumers willing to accept tonnage for shipment over the remainder of this year.

Chicago — Even before suspension of coal mining threatened steel production, consumers of bars were pressing vigorously for faster deliveries and increased

quotas. Evidence of the urgent need for bars and bar shapes is that large consumers are active in acquiring semifinished material and shipping it to bar mills for conversion. Volume of this tonnage is significant. Since most bar mills have excess capacity, handling of this tonnage is not interfering with scheduled output. Large sizes of carbon bars are in lesser demand than smaller sizes.

St. Louis—Revisions in extra cards on some sizes of merchant bars went into effect here last week. On ¼-inch rounds extras went up $2, and on ⅜ to ¾, inclusive, the rise was $1. Reductions of $2 were made on size 1-inch up to 1¼-inch, and $3 on sizes 1½-inch through 1¾. Service extras, such as cutting to length, quality, chemistry and packing were reduced varying amounts ranging from 25 to 50 per cent. Size extra reductions ranged from 20 to 50 per cent, with a few being eliminated. Although some progress is being made on order arrearages, schedules still are filled six to seven months ahead. New business is accepted only for emergency projects. Producers decline to quote firm prices and most deliveries are on a mill-convenience basis.

Steel Plate . . .

Plate Prices, Page 155

New York — While there is a continued good demand for plate from oil companies, demand from tank makers in general is somewhat less active. This reflects in a measure the continued lull in industrial construction, due principally to high costs and uncertainty as to when these costs may become stabilized. Further, there is even less civic demand, although it really never did get off to the start predicted in some quarters once the war ended. There was lively inquiry at one time, but it became apparent soon that costs were out of line with appropriations. Moreover, various tank fabricators refused to quote without inserting escalator clauses in their bids and this in a number of cases forestalled further transactions for the reason that public buyers in general were not permitted under their charters to figure on anything other than a firm bid.

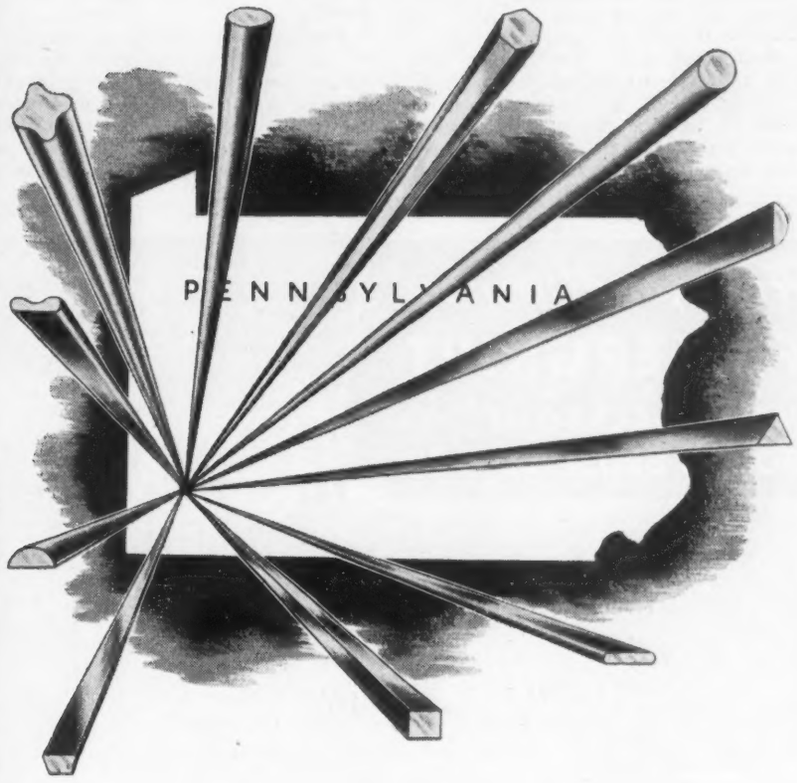
However, most tank fabricators still have substantial backlogs and could operate at a higher rate if their steel stocks were in better balance. At present, it appears that steel supply will continue to be a handicap for at least another several months, as most plate mills are not only behind on current commitments, but are booked ahead with as much tonnage as they care to accept.

Some producers are selling only on a quarterly basis and haven't as yet opened their books for third quarter; others are booked well over the remainder of the year and are accepting nothing for shipment beyond.

Philadelphia—New demand for plates is not quite as strong as it was, but this is ascribed primarily to realization among consumers of the sold-up condition of the mills. However, buyers are exerting greater pressure than ever for tonnage due them, because of continued suspension at various soft coal mines and because of the uncertain labor outlook in steel.

Seattle — Plates continue in strong demand but shops are handicapped by inadequate supplies. Some plants are confining operations to small tonnages, refusing to bid on major projects.

PAGE *Stainless Steel* WIRE



Yes, a lot of the stainless steel wire that is serving the country as part of manufactured products, came from Monessen, Pa. That's PAGE headquarters.

During the many years we have been working with stainless, we have learned much about the applications of stainless steel wire in manufacture. That's why we suggest that when you have a problem involving wire, it will pay you to . . .

Get in touch with Page!

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

Wire . . .

Wire Prices, Page 133

Boston—New demand for and buying of wire has slowed and is more orderly, being geared closed to prospective production schedules for finished wire products. Slightly more finished wire is offered in spots by at least one integrated consumer. On the whole, however, supply of drawn wire in numerous grades is restricted by limited rods available to nonintegrated mills and consumers drawing their own wire. Deferments are usually traceable to inventory curves: A bed spring plant holds up wire because of lack of light angles or other components; a maker of milk bottle carriers, unable to get slit galvanized sheets or strip for reinforcing, holds up on wire. These are typical instances. Most carbon specialties are tight, notably in fine wire gages, also resulphurized, bessemer and other screw stock and small fastener grades, but the overall situation is slightly easier, and a few grades are in balance with demand, including alloys, most welding and rope wire. The lack of balanced rod inventories with many producers retards any general easing in other grades.

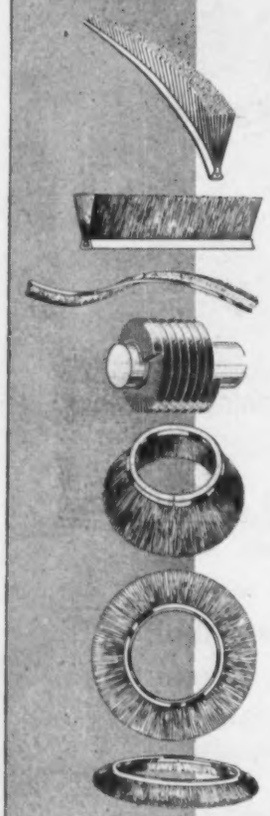
Pittsburgh—Producers of manufacturers and merchant wire items report continued heavy pressure for prompt deliveries, while volume of new demand shows no signs of easing. Return of normal industrial gas supply has made possible resumption of wire products to near capacity level, but there is no indication the huge pent-up demand will be satisfied this year. Expected price action by American Steel & Wire Co., revising extras on some of its manufacturers wire products, was not officially announced up to late last week. Bethlehem Steel Co. is reported to have increased fence posts $8 a ton to column 90.

Cleveland—Tightness in wire and wire products has increased due to the inability of the mills to satisfy the additional seasonal demands for nails, barbed wire, fence posts and similar products. No cancellations of orders have been noted, the order books remaining full. Demand for bicycle spokes made of wire is tremendous. A local spoke producer had hoped to cut deliveries to American bicycle manufacturers in order to again establish foreign markets but found that none of his domestic consumers are receiving enough spokes to meet requirements. Wire rope is available, however, on 6 to 8 weeks' delivery.

Chicago — Overall demand for wire shows no signs of lessening, although there are some indications that a break may come before long. Consumers are unwilling to take what is offered as formerly, are becoming more critical of quality, and are insisting upon specifications ordered. Manufacturers of products utilizing wire, such as the bedding industry, report ultimate consumers are refusing to buy at present prices, and wholesalers are holding back on stocking up. It is expected that demand for bale ties and baling wire will exceed last year's record volume. Although nail output has been very heavy recently, requirements for small and medium sizes holds strong.

Have you discovered
FULLERGRIPT
METAL BACKBONE
POWER BRUSH STRIPS?

For a Wide Variety of Industrial Machinery



A. Can be bent, coiled or formed. Brush material is in to stay.

B. Here furnished in straight strips easily mounted to a core or bed.

C. Here open spiraled . . . any degree . . . any size core.

D. Here close wound . . . to give you practically any specified density.

E. Here cupped . . . to fit a mounting.

F. Here as disc . . . for wheel application.

G. Irregular shapes . . . formed from combinations of basic shapes.

Let our Engineers cooperate on your problem.

WRITE FOR ILLUSTRATED BOOKLET · INDUSTRIAL DIVISION,
The FULLER BRUSH Co.
3582 FULLER PARK HARTFORD 2, CONN.
FULLER GRIPT

Structural Shapes . . .

Structural Shape Prices, Page 133

Boston—As structural steel fabricators appear to be over-committed on basis of current allocations and prospects for plain material, buying for fill-in sizes is substantial. Warehouse stocks of shapes are low with pipe lines of supply to distributors well drained. On new volume, mills are booked well into August and beyond, with freight car requirements for special sections constituting a potential added load. Despite this situation, there are indications of further easing in structural demand by late summer, already apparent in low seasonal new inquiry predicated on high building cost. Including bridges and other work, an estimated 45 tons of fabricated material is high for this immediate district. Small building projects are off to a slow start thus far this year and major construction-engineering activity is more hesitant.

New York—Although there are a fair number of jobs pending, the structural steel market continues to lag. Few outstanding awards or sizable inquiries have been reported recently. Major deterrent is continued high costs and uncertainty as to when there will be a stabilization.

Philadelphia—One eastern shape mill, which has long been quoting premiums over the going market, has advanced its price another $5 a ton, now asking 4.00c, Bethlehem, Pa., equivalent. However, this figure is largely nominal, as this producer has little tonnage to spare, due not only to operating difficulties, but to export commitments as well. Structural activity continues to lag, with little out-

standing being placed and inquiries spotty.

Pittsburgh — Rejuggling of projected production schedules on shapes and other steel products to meet the 10,000-car-per-month freight car assembly program, plus repair of worn out equipment, will be necessary in varying degrees among steel producers. Structural fabricators have been able to make only slight headway against record order backlogs in recent months, despite fact mill shipments have been relatively good since the first of the year. Proposed construction work recently approved by the Office of the Housing Expediter includes a $212,100 project for Elliott Co., Jeannette, Pa., and $118,000 expansion at Allegheny-Ludlum Steel Corp.'s Brackenridge, Pa., plant.

Chicago — Fabricators are bidding cautiously on new work, being committed close to the limit of their mill quotas and feeling uncertain as to what diversion of steel to the freight car building program will do to these and future quotas. The current curtailment of mining has introduced a new element to cause concern. Even before the latter arose, structural and plate producers believed they would be obliged to cut second and third quarter quotas of customers. Most of the new inquiry coming out is for bridges and other public work, and in some instances fails to attract bids. When bids exceed estimates by wide margins, it is not uncommon for bids to be rejected and new ones taken. A few state projects have been advertised as many as three times.

Birmingham — Fabricators here are being swamped with inquiries, mostly for medium-sized jobs that range in type from schools and churches to power plants. Meanwhile, they are attempting to meet heavy demand from builders of small jobs who want immediate delivery despite the limited steel supply.

Seattle—Fabricating shops are bidding cautiously for major jobs due to an acute shortage of materials. Plants are booked at capacity on steel available, current jobs being in small tonnages.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 155

Cleveland—Shortage of wire rods and small bars continues to limit production of fasteners in this area. Many manufacturers of consumers goods press relentlessly for increased allotments and claim lack of fasteners is principal factor preventing greater output of their products. One bolt producer, to accumulate enough steel to permit quantity runs, periodically switches all machines to production of brass items. When steel is available, the machines work night and day to catch up with orders. Demand for the smaller sized bolts, ⅝ inch and under by 6 inch, shows no sign of easing and, as the freight car building program gains speed and seasonal construction picks up, larger diameter short bolts are becoming critically short. When government premiums for production of wire nails ceased, deliveries of wire long promised one screw and bolt producer here started coming through in dribbles.

The most recent revision of extras on carbon bars and strip has worked to the detriment of bolt and nut producers, a leading interest asserts. He claims his costs of raw materials, including steel and brass, have increased by more than 100 per cent since 1940.

Chrome Ore . . .

Bellingham, Wash.—In their effort to attract industries to this city, civic leaders are turning their attention to extensive deposits of chrome and olivine in the nearby Cascade mountains. With cheap power available, they visualize active mining in this area.

Particular attention is being directed to a deposit of olivine, containing billions of tons. Several years ago samples of this ore were forwarded to Harbison & Walker, Pittsburgh, and proved to be about 20 per cent higher in magnesium silicate than ore from North Carolina. Already 24 carloads of this material have been shipped to a refractory brick plant and 250 additional cars are to be forwarded this summer. Sponsors of the plan hope there will be sufficient demand for this brick on the Pacific Coast to justify a plant here.

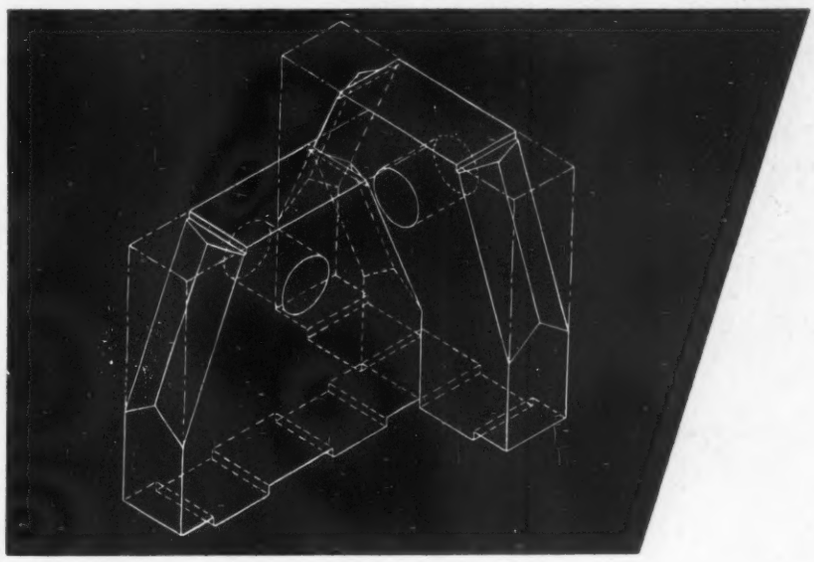
Associated with this olivine is chrome ore in the form of oxide, running from 36 to 52 per cent.

Tubular Goods . . .

Tubular Goods Prices, Page 155

Seattle — Cast iron pipe market is firm on good demand, in spite of mill shortages and delayed deliveries. Several major projects have been postponed on account of conditions but the potential market is of large proportions in this area.

the **first** **REAL IMPROVEMENT IN CHECKER BRICK CONSTRUCTION**



SEAVER CROSS-VENT CHECKER BRICKS

—the *Improved* Basket Weave

increases heating surface 30% over present installations in stoves with plain basket weave checkers—90% of volume exposed—gives equalized heat and air over complete checker area—turbulence and high heat exchange—securely locked in position, cannot twist or turn —may be used with or without tubular inserts. Cost comparable to ordinary basket weave brick.

Write Today for blueprints and further information. We shall be glad to show you how this flexible, high efficiency checker system can be applied to meet your conditions.

COMPLETE SERVICE TO THE IRON AND STEEL INDUSTRY

CONSULTING • DESIGN • CONSTRUCTION • REPORTS • APPRAISALS • INVESTIGATIONS MANAGEMENT AND OPERATION • THIRTY-FIVE YEARS EXPERIENCE IN THE INDUSTRY.

Jay J. Seaver, Engineers, 100 North La Salle St., Chicago 2, Ill.

Tin Plate . . .

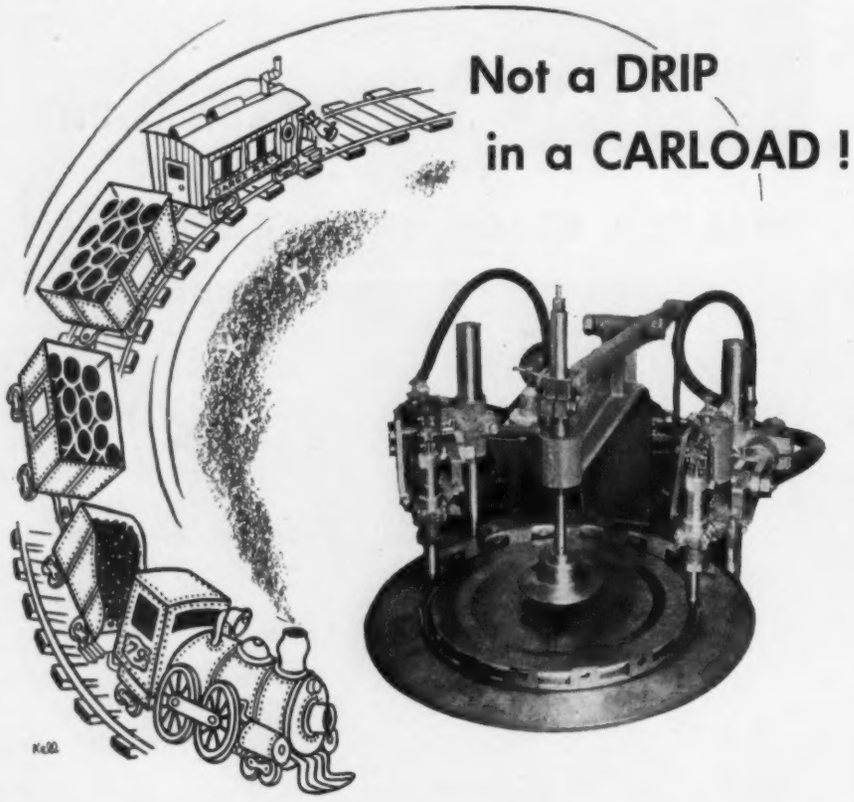
Tin Plate Prices, Page 155

Pittsburgh—Tin consumers now must pay 80 cents a pound for tin, following RFC's agreement to pay Bolivian producers nine cents a pound more for tin this year. Indicated 1947 pig tin supply of about 69,000 tons is about 6000 tons below earlier estimates, which combined with unsettled European conditions makes unlikely any lifting of tin coating regulations in immediate future. Easing in order M-81 some months ago, governing tin container packaging restrictions, has resulted in record breaking demand for electrolytic tin plate. Demand for electrolytic this year likely will double 1946 requirements. Some producers report electrolytic tin plate output now exceeding hot-dipped. First-quarter tin plate production held up very well, but continuation of present practical capacity production schedules is threatened by uncertain status of coal mining operations.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 154

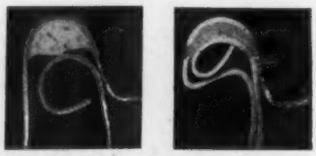
Seattle — Northwest Steel Mills Inc. is running short of ingots and has adjusted its operations accordingly. Mills are giving preference to regular customers and shipping much of current tonnage in small lots. Several major construction projects have been delayed because of high costs and inability of mills to roll their orders.



The major requirement of any sealing closure is that it must seal tightly to protect contents of steel pails and drums from leakage during shipment. DAREX* "Flowed-In" Sealing Compounds give this assurance. DAREX Compounds are "flowed-in" to cover grooves in liquid form and then the water is expelled by evaporation. This process thoroughly sets the compounds in the cover grooves and results in a resilient, deformable sealing closure that becomes an integral part of the cover itself.

No, not a drip in a carload of your customers' products when DAREX "Flowed-In" Sealing Compounds are used. Write today for further information on DAREX, the "Flowed-In" Sealing Compound that becomes an integral part of your steel products.

A product of
DEWEY AND ALMY
CHEMICAL COMPANY
CAMBRIDGE 40, MASS.



*Reg. U. S. Pat. Off.

DAREX "FLOWED-IN" COMPOUNDS MEAN BETTER STEEL PRODUCTS OF ALL KINDS

Pig Iron . . .

Production curtailed due to growing shortages of fuel supplies

Pig Iron Prices, Page 156

Chicago—Another week of idleness by coal miners, and foundries will be having their pig iron supply reduced. While no blast furnace operator here planned to shut down furnaces last week, all were taking measure of their coal and coke inventories and were preparing to bank furnaces promptly if conditions should suggest that course. Some foundries in the Indiana-Illinois district already have had to reduce operations because of coke shortage—this induced by a strike at the municipally-owned Citizens Gas & Coke Utility in Indianapolis. Foundries had been operating at a high rate recently and had been optimistic over the future.

Boston—Response to the five-year cooperative agreement plan of Mystic Iron Works, Everett, Mass., is sufficient to assure continued operation of that furnace after expiration at the end of this month of the $12 per ton subsidy premium. This plan calls for $45 a ton, fob Everett, with usual differentials for silicon, phosphorus and manganese during the first year. During the following four years, the price will be on a cost-plus sliding scale, but not exceeding at any time by $5 the Buffalo delivered price. Consumers have the right to cancel part of the agreement tonnage if requirements decrease. Under the sliding scale, price will include Mystic costs, excluding coke, deduction of average differentials for analysis, plus 19 per cent or $4.75 per ton, whichever is less. Coke is to be figured 1.5 times cost of coal. This maintains Everett as a basing point and means consumers nearest Everett will pay the lowest prices on an fob basis. Basic iron is not included in the agreement and melters of that grade, badly pinched for iron, must await relief from other quarters. This means a sharp increase starting next quarter in iron costs to foundry consumers, most of whom have been paying $29.50, Everett base, under the premium plan.

If the price of Mystic iron after the first year is higher than the delivered price of Buffalo iron, the consumer may reduce his agreed tonnage volume for any quarter by 60 per cent. The Everett furnace annual capacity approximates 180,000 tons and the potential melt in New England, exclusive of basic, is estimated at 300,000 tons, at least early in the five-year period. It becomes obvious the balance of foundry iron will emanate from outside furnaces.

Some Lone Star Texas iron has been contracted for, but unless a commodity freight rate is granted, delivered prices at Boston will approximate $69.25 a ton. Prospects for foreign iron are dimmer, but such iron costs about $75 unloaded in Boston. Little or no tonnage is coming in from Buffalo this month.

New York—So far eastern pig iron producers have been able to sustain production, notwithstanding suspended operations at many of the soft coal mines. However, unless there are definite indications of an early break in the coal situation, some furnaces in the East may be forced to bank. Meanwhile, district

pig iron consumers have been just about able to hold their own at a rate well under capacity.

Pittsburgh—Pig iron output was curtailed further last week as result of the coal crisis, leading steel producer here being forced to bank two blast furnaces and to reduce blast on others. Other producers maintained capacity operating schedules, although they were making plans to reduce output should the "safety" strike continue. In addition to the furnaces banked and put on reduced wind, Carnegie-Illinois has blown out its No. 5 blast furnace at Edgar Thomson works for relining. At the close of last week, the equivalent of 34 out of 47 units in this district were operating at capacity. Foundry operations here have not yet been adversely affected by the growing coke shortage. Shortage of cast scrap and drying up of merchant iron shipments from other districts has accentuated the general pig iron shortage. While lone merchant blast furnace interest is able to meet only about 60 per cent of monthly requirements, it is probable that distribution pattern will be on a more equitable basis with the lifting of directive tonnage as of Mar. 31.

Philadelphia — One district pig iron producer, in an effort to conserve coke, is using anthracite to the extent of 30 per cent of his fuel charge. Despite the soft coal situation, eastern blast furnaces have been able to maintain production and are looking for no immediate curtailment.

Cincinnati—Supplies of foundry iron, already tight, show no signs of easing in view of the coal mine stoppage. Recently the lag in northern iron shipments has been more pronounced than in southern iron, but now the outlook from both sources is clouded. Trends in scrap have failed to lighten the demands of melters for prompt shipments and for heavier allotments.

Birmingham — Instead of falling off, demand for iron here grows in intensity. Requirements of new businesses, working full-time, add to the headaches of sales managers who would like to please both new and old-time customers. Blast furnace capacity simply is not sufficient to meet the terrific demand from pipe shops and foundries.

Producers of pig iron in the South say they have been put at a disadvantage by the Jan. 1 increase in freight rates because it narrows the territory into which they can economically ship pig iron in competition with northern makers. The advantages previously enjoyed by the short haul competitive shippers in the territory north of the Ohio and east of the Mississippi rivers, they say, were greatly enhanced by the percentage method of increasing freight rates. As a result, companies like Sloss-Sheffield Steel & Iron Co. and Woodward Iron Co. are said to be at a further disadvantage in serving importast markets to which they normally look for a portion of their pig iron sales.

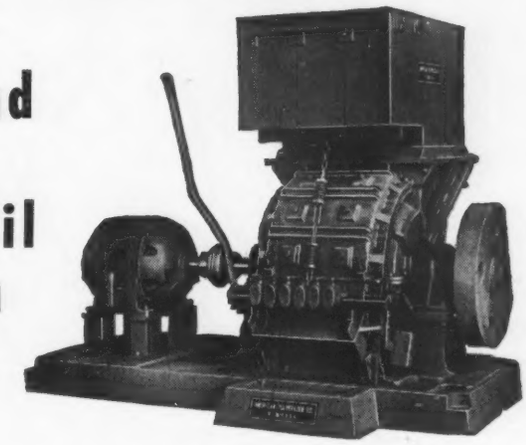
St. Louis—Local pig iron supplies are the tightest in months, due primarily to continued shutdown for repairs on one of Koppers Co. Inc.'s two furnaces. The basic 500-ton furnace was cut off and operation of the other 500-ton furnace is being alternated between basic and foundry iron. Further uncertainty exists here because of failure of bids to be made in Washington for purchase of the Koppers DPC furnace. Koppers is planning to operate it on a temporary basis under an interim lease which has been extended to June, 1948. Scant interest in the proposed sale was attributed to reports it is a high-cost unit, approximating $28 a ton as compared to a normal $20 here. Outside shipments to this area remain at a low level.

Arrangement of the interim lease under which Koppers Co. operates government-owned pig iron production facilities, Granite City, Ill., has been extended until June, 1948. The plant was advertised recently by the War Assets Administration for sale or lease but no bids were received. Preliminary negotiations for its disposal are under way with several potential purchasers. The property includes two blast furnaces, coke ovens, a by-product plant and other equipment. The rated annual capacity is 465,000 tons of pig iron and 435,000 tons of coke and by-products.

Seattle — An easer supply situation in pig iron and cast iron scrap is reported by foundries here. Lifting of restrictions by Civilian Production Administration permits pig iron producers to allocate their output to better advantage and local foundries are receiving larger shipments. Scrap also is freer and foundry operators believe they have passed the crisis, which not long ago threatened drastic curtailment. Business is active and plants anticipate a steady flow of orders over the balance of the year.

Crush your turnings with an American Ring **TURNINGS** *Crusher*

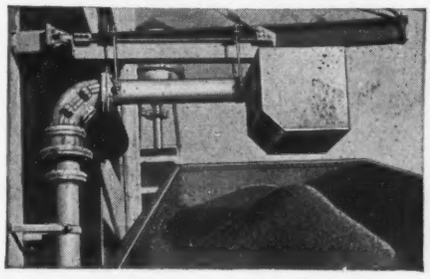
For Easier Handling and Storage— Increased Oil Reclamation



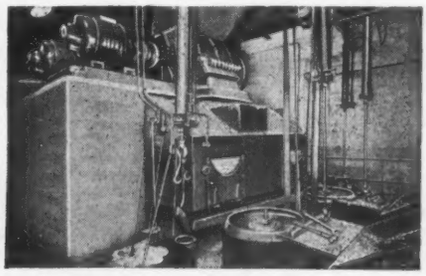
The rapid reduction of long, curly, hard-to-handle turnings into short shoveling chips with Americans solves handling and storage problems. The low cost at which Americans operate makes their installation highly profitable. The yield of cutting oil is increased 30 to 50 gallons per ton. Alloy steel, carbon steel, aluminum, brass, copper and bronze turnings are reduced to uniform chips by Americans in capacities from 1 to 10 TPH.

PATENTED MANGANESE STEEL SHREDDER RINGS

Patented manganese shredder rings, revolving free on individual shafts, prevent clogging and damage to crusher from tramp iron.



Properly reduced chips enable economical handling in blower, conveyor or manual operations.



The uniform chips provide increased yield in cutting oil reclamation of from 30 to 50 gallons per ton.

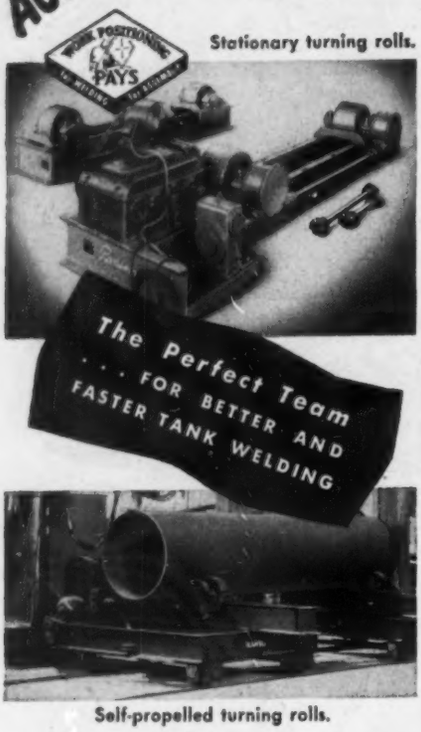
Send for "Metal Turnings Bulletin"

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1539 MACKLIND AVE. ST. LOUIS 10, MO.

TURNING ROLLS AND AUTOMATIC WELDING



Stationary turning rolls.

Self-propelled turning rolls.

The constant uniform speed of Ransome Turning Rolls makes them ideal for use with automatic welding heads when welding large circular tanks and cylinders.

The units are equipped with variable speed transmissions, giving a wide speed range and means for changing the center-to-center distance of the rollers for handling work of various diameters. Smoother, better welds and more economical production result. 77-6

Write for full information

- WELDING POSITIONERS
- HEADSTOCKS-TAILSTOCKS
- SPECIAL POSITIONING EQUIPMENT

Ransome
MACHINERY COMPANY
Dunellen, New Jersey

Subsidiary of
WORTHINGTON PUMP AND MACHINERY CORPORATION

Scrap . . .

Scrap Prices, Page 160

Pittsburgh — Incoming scrap receipts on old orders have been unusually heavy the past few weeks, with the result that inventories are being built up in spite of near capacity steel production schedules. Carnegie-Illinois Steel Corp. has canceled all old orders that have expired in an effort to clear books of "dead wood," and, as in case of other steel producers in this district, continues out of the market on open hearth grades. Prospect of steel producers' success in this latest effort to stabilize scrap prices is conceded more chance of success than the two previous attempts since OPA decontrol. Market for electric furnace and foundry scrap grades continues very strong at near the top price levels reached last month.

There is still no indication at what price level mills will place new orders for local and remote material, some claim to be in no hurry to enter the market being in best inventory position in months and because of the brighter supply outlook resulting from more open weather conditions permitting greater collection and segregation activity. All available material is moving rapidly into consumer channels for there is a growing belief among dealers and brokers that next price move likely will be downward.

Philadelphia — Scrap prices continue to weaken on light new buying with tonnage moving freely against old orders. Heavy melting steel is off $2 a ton. And even the cast grades are lower notwithstanding the unsettled condition in soft coal and its threat to pig iron production if continued much longer. Both grades of heavy melting steel, No. 1 busheling and No. 1 bundles are now holding at $34, delivered. Meanwhile, there is a tendency for the first time in a long while to sell No. 2 bundles at a differential under those other grades, with the market $33 to $34, delivered. Machine shop turnings are being quoted at $23-$24, delivered; mixed borings and turnings, $23; and short shoveling turnings, $26. Bar crops and plate, punchings and plate scrap and cut structurals are $37-$38; electric furnace bundles, $35-$36; and heavy turnings, $33-$34.

Recent high prices have stimulated the flow of cast and this combined with a better allotment of pig iron than anticipated have caused two leading consumers to drop from the market temporarily, with result that No. 1 cupola cast has declined to $48-$49, delivered. Charging box cast is to down $46-46.50; heavy breakable cast and unstripped motor blocks, $44-$45; malleable, $48-$49; clean auto casts, $48; and No. 1 wheels, $46-$48.

High bidder on 90,000 tons of scrap accumulated by U. S. Army in Germany is the Canterbury Corp. of Delaware whose identity otherwise is unknown. Its bid is said to be $8 a ton for prepared material, fob cars Bremerhaven, Germany, and $7.50 for unprepared. Low on 10,000 tons is Luria Bros. & Co., Philadelphia, with a price of $8.10. Situation with respect to an additional 50,000 tons is still to be clarified. Minimum loading charges at the German port are estimated at $2 a ton, if done by private interests, and $3, if done by the Army. Ocean freight is estimated at $10 a ton.

Boston—A differential in steelmaking grades has been re-established and pressure is on for others as prices remain unsettled at lower levels. No. 1 busheling is $2 under heavy melting and the two top bundle classifications. Bulk of new volume in the latter grades has been done at $29, fob, but with lower prices also reported. Business in turnings is slow, consumers now being better supplied. Outstanding old orders are being cleared up; one includes low phos at a $2.50 differential. Cast scrap has not followed open-hearth steel in the reaction and prices hold close to recent high levels. Consumer inventories are low and available scrap is limited.

New York—Reflecting in part the continued suspension of operations at most soft coal mines, which in turn has already resulted in some curtailment in pig iron production, the scrap market here shows some evidences of firming. This is true in heavy melting steel.

No. 1 cupola cast was quoted $41 to $42, representing a drop from earlier in the week when some brokers were paying as high as $45 a ton, fob shipping point.

Although some brokers are still offering $32 for the principal melting steel grades and are collecting some tonnage, others are paying as high as $33 in an effort to get covered on commitments. This is slightly higher than recently. The general spread is $32 to $33 on No. 1 and No. 2 heavy melting steel, No. 1 busheling and No. 1 and No. 2 bundles. No. 3 bundles are $30 to $31. Mixed borings and turnings and machine shop turnings are being purchased by brokers at $21 to $22. Short shoveling turnings are off somewhat to $23.50. Low phos scrap also is a little easier, with punchings and plate scrap and cut structurals at $32 to $34, and electric furnace bundles $31.50. Apart from No. 1 cupola, there is little or no change in the cast grades.

Buffalo—Restricted buying interest and weakness continued to dominate the scrap market last week. Sales were reported at slightly above the quoted range of $35 to $37 for heavy melting and bundles. However, demand at this level was soon filled and prices were quoted nominally at prevailing ranges. Machine shop turnings sold at $25 to $26, off $2 to $3. Similar price recessions took place on short shoveling turnings which changed hands at $27 to $28. Dealers are making no efforts to conceal the weaker tendencies. Not caught with any sizeable inventories acquired at higher prices, dealers are not too disturbed over the market's recent action. A decided increase in supplies has tended to bolster sentiment as indications point to heavier sales.

Cleveland—Scrap prices eased about 50 cents a ton here last week, although definite levels were difficult to determine due to lack of actual sales. No. 1 heavy melting steel was offered at $34.50, delivered, while machine shop turnings were quoted $28.50 to $29. Low phos scrap was lower at $37 to $37.50. Baltimore & Ohio and New York Central scrap sold at prices unchanged from the previous month's levels, with the notable exception of malleable which is scarce and in heavy demand by foundries. This grade is quoted $57 to $58. Movement of scrap continues heavy on old commitments with users' inventories increasing steadily. The government received bids on 5000 tons of debanded

shell steel last week with the low $37.42 and the high $39.55, fob Ravenna, O.

Cincinnati—An embargo on shipments to a major melter, because of a glut of remote scrap, contributed to a drop of $2 on most grades. More tonnage is coming out, and in some cases brokers are wary of taking a long position on these offerings. Steel foundries are well stocked, but cast is taken eagerly. Market activities were slowed by the telephone strike.

Chicago — Although steelmakers will pay no more than $33 for open-hearth scrap, few transactions are being consummated. Bulk of activity in the trade is the filling of old orders booked at the $36 price. Enough material is moving to mills via the old orders to sustain steelmaking operations. Much of the inactivity in new purchases can be attributed to the stoppage of coal mining. Meanwhile, prices on most grades of scrap are on a nominal basis.

Birmingham — Heavy melting steel continues to bring $33 per ton here and, although that price is a $3 drop from the high of last month, all types of material are coming out in large volume. Buying has eased somewhat and inspections are becoming more rigid. Demand for supplies from northern and eastern mills has eased.

St. Louis—Most scrap prices in this district have eased $3 to $5 a ton, while a few have firmed at premium levels formerly regarded as too high to be considered established. Break was reported precipitated by one broker who became apprehensive and unloaded substantial tonnage, allowing mills to stockpile up to 30 days. Mills subsequently withdrew from the market with the expectation of forcing prices lower on May 1 orders. Most brokers believe a further price decline, possibly $4, is coming next month. Remote collection points serving this district are producing unexpectedly well.

Seattle — Increased receipts of steel scrap are reported by the mills and inventories are beginning to grow. The improved situation is attributed to better weather, stimulating gathering of country scrap, attractive prices, and the decline in eastern prices which has speeded shipments. Production of ship scrap has increased and altogether the outlook is promising for the next quarter.

Los Angeles — Scrap prices here have risen to levels comparable with those in other West Coast industrial areas. Prices likely will remain steady for some time now inasmuch as supply sources can keep pace with demand. Nos. 1 and 2 heavy melting and Nos. 1 and 2 bundles are $19.50 per gross ton. Machine shop turnings and mixed borings and turnings are $11; electric furnace prepared plate cuttings, $27; electric furnace No. 1 prepared, $27.50, delivered. There is little or no railroad scrap available. Automobile scrap is available but in negligible quantities. One firm is marketing at the No. 1 melting price tin-can bundles in which mixtures of "ground" iron is used.

Warehouse . . .

Warehouse Prices, Page 157

Philadelphia — Readjustment in mill extras has resulted in a drop of $5 a ton in the warehouse base on cold-drawn bars. Under the new schedules, warehouses are now quoting on a mill parity on cold-drawn up to 1999 pounds. Re-

STEELBINDER
New STEEL STRAPPING

• A new type strapping, a standout combination of strength and pliability, developed by A.J. Gerrard strapping specialists and metallurgical engineers.

ties tight . . .
So pliable it forms snugly around objects of all shapes . . . solves your "problem" strapping.

holds tight . . .
More than adequate in its tensile strength. Stands sudden, violent shocks without snapping.

available now . . .
In standard 3/8", 1/2", 5/8" and 3/4" widths . . . in thicknesses of .015", .020" and .025".

free sample
ON REQUEST

STEELBINDER
ONLY STRAPPING TOOL COMBINING
These Three Features
1. Ties a Tighter Tie on all sizes and shapes, even round.
2. Handles all strap sizes without adjustment.
3. Cuts strap automatically.

A.J. Gerrard & Co.
221-X NORTH LA SALLE ST., CHICAGO 1, ILL.

have you seen the New
A.J. GERRARD
FIBER and STEEL Strapping?
Applied *directly* on painted or enameled surfaces.
•
Write for free sample!

Specify STROM BALLS

Hand Gauging of large diameter Strom Balls before packaging

When you specify Strom Balls you are sure of getting balls with the highest obtainable degree of finish, sphericity, precision—balls that give the very highest quality of service in any bearing equipment. This high degree of perfection is the result of Strom's concentration for a quarter of a century on metal balls exclusively and the perfection of the processes and workmanship necessary to produce them. Strom Steel Ball Company, 1850 South 54th Avenue, Cicero 50, Illinois.

Strom BALLS Serve Industry
LARGEST INDEPENDENT AND EXCLUSIVE METAL BALL MANUFACTURER

Accelerating assembly lines with accurate parts in large quantities is our specialty.

Time saving methods and devices we have recently invented enable us to make parts better and faster for less!

The more space you devote to assembly, the more products you market. Plan on U. S. to start your assembly lines sooner.

U•S•AUTOMATIC
CORPORATION
Screw Machine Products
AMHERST • OHIO

flecting changes in mill extras, jobbers have also reduced their base on sheared and universal plates $2 a ton to 4.44c for city delivery and 4.34c for outside. One district jobber is quoting a premium on all tonnage received from the Phoenix Iron Works in line with premiums asked by the producer, but is quoting all other shapes at a price predicated on a 2.50-cent eastern mill base. Another, but smaller jobber, is quoting all shapes at 5.44c, predicated on the 4-cent Bethlehem equivalent base now quoted by Phoenix Iron Works. Most district warehouses, however, are quoting structural shapes at 4.22c, city delivery. Warehouse demand generally remains brisk, especially in sheets, plates, bar size angles and small hot carbon bars.

Cleveland—Inventories of most steel products in warehouses continue to decline as supply falls far short of requirements. Brisk demand for small flats and rounds, which are in shortest supply, shows no sign of abating. Wire rope, on the other hand, is comparatively abundant, deliveries being made in 6 to 8 weeks, which is a normal situation. The expanding freight car building program is skimming the cream off supply of plates to warehouses.

An encouraging note in the fight against the "gray" market, which impairs jobbers' functions and occasionally reflects on their integrity, is a noticeable decline in brokers' offerings both to consumers and jobbers. Whether the downward trend of these dealings results from increasing buyer resistance or greater stringency by mills in keeping steel out of unscrupulous sellers' hands is not known, but warehousemen are relieved by the tendency.

Recent revisions of mill extras and changes in the freight rate structure have been reflected in warehouse steel base prices here. Price of cold-finished bars has declined 0.20c a pound, city, and 0.25c, country, to 4.75c and 4.60c, respectively. Carbon plates, 3/16-in. to ¾-in., are now quoted at 4.25c, city, and 4.10c, country. Floor plates, ⅜-in. and thicker, are listed now at 5.961c, an increase of 0.15c. City prices of hot- and cold-rolled sheets have increased 0.05c as have those for cold-rolled strip and hot-rolled bars. Prices for galvanized sheets, hot-rolled strip, hot-rolled alloy bars and structural shapes have not changed.

Boston—Due primarily to limited tonnage of steel products expected to be received from mills this quarter, warehouse volume of business likely will hold at the lower level reported in the first quarter. Warehousemen, who claim receipts in this area are below the national average by districts, expect smaller receipts of carbon flat-rolled products, structurals, plates and small carbon bars. New inquiry is slightly lower. Revision in warehouse prices in line with revised mill extras is complete. Alloy product inventories are sufficient to meet demands. Machine tool builders' requirements are slack.

Chicago — Distribution of steel by warehouses continues at high level, although many products, notably flat rolled, are in distressingly low supply. At present, consumers and distributors alike are concerned over possibility of still lower supplies if the coal mining stoppage interferes with steel production.

Los Angeles — Steel warehousing industry is in a somewhat anomalous situation. Prices admittedly are in a state of flux. Warehouse firms are seeking reductions from mills and indicate that detailed price schedules will be announced within two weeks. Mill spokesmen take the position that warehouse prices in the area are "too high" on a basis comparable to other steel centers in the nation. This condition, it is said, is inducing or at least contributing to interest on the part of eastern warehouse firms as to the desirability of entering the market on wider front.

Rails, Cars . . .

Track Material Prices, Page 155

New York — Freight car deliveries by the railway car building industry increased 36 per cent over the February low, S. M. Felton, president, American Railway Car Institute reported last week. Car builders produced 2439 units while railroads produced 444 in their own shops, making a total of 2883 cars delivered to American railroads during the month.

New cars ordered in March totaled 12,049, making the monthly average for the first quarter about 11,900 as compared with an average of only 2805 in the like 1946 period. The backlog of freight car orders now stands at 94,947, or more than double the figure a year ago. Of cars now on order, 55,778 are box cars and 26,627 hoppers which are types most needed to reduce the present acute car shortage.

"There is strong evidence," Mr. Felton said, "that March marked the turning point in freight car production and that deliveries now can rise rapidly in direct proportion to the additional steel to be made available for car building."

To meet the proposed production schedule of a minimum of 10,000 freight cars a month, the steel industry will increase the allotment of steel over the present 7000 car schedule, increasing the amount of steel by about 43 per cent. By stepping up production during May, the program is expected to reach 10,000 cars by June, according to Colonel Johnson, director, Office of Defense Transportation.

Following is a comparative table covering monthly awards of cars for domestic operation placed in both commercial and railroad shops:

	*1947	*1946	1945	1944
Jan.	9,905	1,500	7,200	1,020
Feb.	13,727	2,403	1,750	13,240
March	12,049	4,512	2,500	6,510
April	....	3,764	1,120	4,519
May	....	3,025	1,526	1,952
June	....	3,335	670	1,150
July	....	14,836	3,500	795
Aug.	....	9,629	7,240	3,900
Sept.	....	12,768	12,840	400
Oct.	....	3,407	1,320	2,425
Nov.	....	6,707	1,650	1,065
Dec.	....	3,041	4,116	16,245
Total	....	68,927	45,432	53,221

* American Railway Car Institute.

Pittsburgh—The steel industry has agreed to make available 210,063 tons monthly of plates, shapes, bars, sheets, wheels and other railroad car accessories to implement ODT's program, plus repairs to worn out equipment. Steel tonnage requirements as now established under this program have been broken down by types of cars and specific allotments for individual car builders, and represents a compromise from the original request of 230,000 by the builders. Rejuggling of projected production schedules on shapes and other steel prod-

ucts to meet this program will be necessary in varying degrees among steel suppliers. To meet requirements of center sill sections, for example, an adjustment is necessary in output in other structural sections of leading producer. Materials in short supply for this program include: Plates, sheets, steel wheels and lumber. Iron wheels may have to be substituted on some domestic cars this year, although the pig iron shortage is an important factor here. There is some evidence that March was the turning point in freight car construction, with strong prospect that deliveries will now rise steadily in direct proportion to additional steel made available. New cars ordered in March totaled 12,049, bringing the total backlog to 94,947, more than double the comparable 1946 figure.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 156

Pittsburgh—Connellsville beehive furnace coke was advanced 50 cents per net ton recently, making the price spread $8.75 to $9.50. The price spread on Connellsville beehive foundry coke is unchanged at $9.75 to $11. Operators of hand-drawn ovens using trucked coal now are selling beehive furnace coke within the range of $9.35 to $10.10. New River beehive foundry coke price has been advanced to $12.50 per ton, up 75 cents. Sellers of Wise county beehive foundry and furnace coke report prices unchanged at $11.15 and $10.65, respectively. By-product foundry coke prices also remain unchanged.

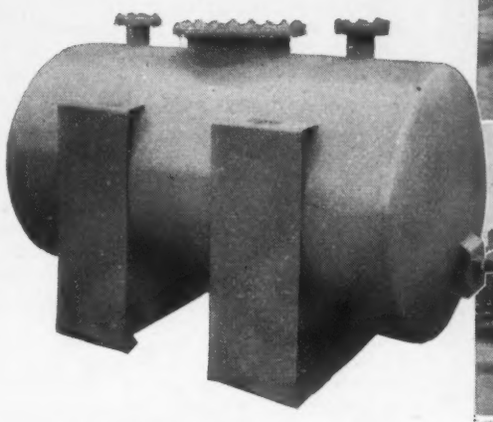
Output of beehive coke has been adversely affected by recent interruptions to coal mining operations, H. C. Frick Co. having been forced to bank all its ovens in this district. Foundry operations have not yet been adversely affected by the general coke shortage, although in most instances inventories are well below normal with some foundries reporting coke in more critical supply position than pig iron. Active bidding for limited foundry coke supply from automotive foundries outside this district further accentuates the tight supply situation. Coal inventories of Domestic Coke Corp.'s ovens at Fairmount, W. Va., represent about 3 weeks' supply at present operating rate.

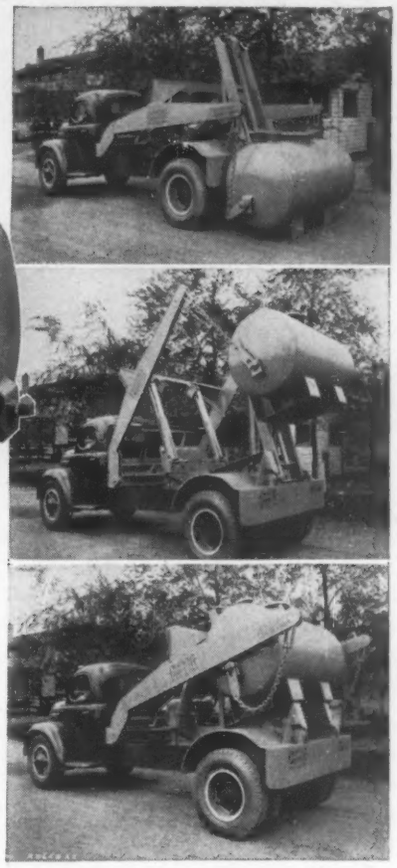
Cleveland—The area's leading producer of by-product foundry coke has not yet reduced production as a result of the nation's coal mines' "safety" strike. Such curtailment might come rapidly, however, if the work stoppage is prolonged. Special attention is given by this interest to supplying consumers with only as much coke as can be used immediately. Demand from foundries continued unabated, with many consumers pouring iron at unprecedented rates.

Canada . . .

Toronto, Ont. — Canadian producers see no indication of an early end to present heavy pressure on them for iron and steel shipments. Industrial operations have received a set-back due to steel shortage and it is reported that the automotive industry is failing to meet its production quota owing to lack of steel. Various other manufacturers also have been seriously affected on this account and industrial leaders do not look for supply of durable consumers goods

ONE MAN — ONE TRUCK —ANY NUMBER OF BODIES





In this installation, bodies happen to be rubber lined acid tanks. Built for any liquid or gas, in 500, 750, 1000 gal. capacities. It's the Dempster-Dumpster system of low cost materials handling - one truck hoisting unit handles any number of a dozen different types of regular or special types of bodies to suit your requirements, up to 10 cubic yards capacity. Write for catalog now.

DEMPSTER DUMPSTER
TRADE MARK REG.

DEMPSTER BROTHERS, INC.

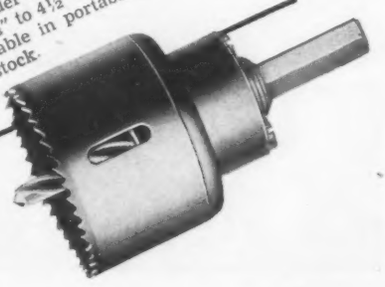
547 Springdale, KNOXVILLE 17, TENNESSEE

Fast **Tough**

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively *unbreakable* under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

Heavy feed at high speed!

The same exclusive *unbreakable* feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 5/8" to 4 1/2" diameter in stock up to 1 1/8" thick. Usable in portable drill, drill press, or lathe tail stock.

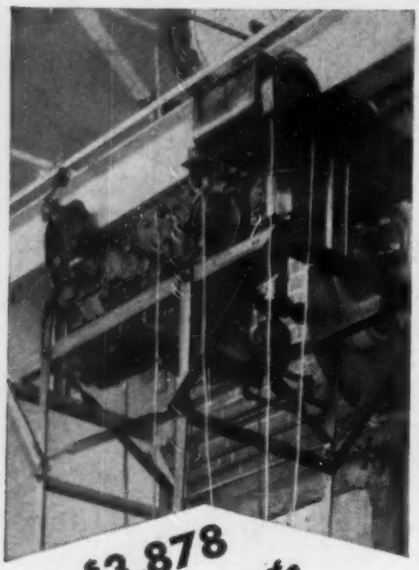


HIGH-SPEED-EDGE MARVEL ARMSTRONG-BLUM MFG. Co. CHICAGO, U.S.A.

Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.



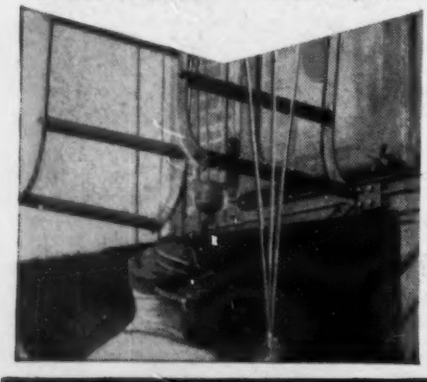
A $3,878 answer to YOUR HANDLING PROBLEMS

- Here's *real* proof—in dollars and cents—that Reading Electric Hoists can help you cut handling costs and step up production, *right now!* This Reading-engineered Electric Hoist, used for coal and ash handling, did more than "pay its way" through peak performance.
  - $3,878 saved—*every* year for more than 12 years!
  - Maintenance costs averaged less than 1% for over 12 years!
  - Fuel costs cut by more constant boiler firing.
  - Less dust and dirt — reduced boiler room cleaning time.

Decide now to put *all* the cost-reducing advantages of Reading-engineered Electric Hoists to work in your plant. Contact us—let a Reading engineer work with you—give you real help in getting the right hoist for your job.

CHAIN HOISTS • ELECTRIC HOISTS
ELECTRIC TRAVELING CRANES

READING CHAIN & BLOCK CORP.
2102 ADAMS ST. • READING, PA.



READING HOISTS

in the current year to show much improvement over 1946.

Production of iron and steel in Canada, however, has registered a sharp gain since the turn of the year and is expected to continue its present pace for some time into the future. However, producers state there is little prospect of supply and demand equalizing before the latter part of this year. While steel prices remain unchanged, there has been some intimation from officials of Wartime Prices and Trade Board that steel prices would be moved upward this year, but no actual date was announced.

Placing of new orders for most steel materials has slowed down due to the fact most mills now are fully booked on production for second and some have withdrawn from the market declining orders extending beyond the end of June. Demand has been specially heavy on steel plate for shipbuilding and for use in rolling stock plants. With some improvement in supply of heavy structural shapes from the United States, more activity is reported in new construction activities. Wire and nails, however, continue in short supply, and small consumers are unable to obtain nails for urgent needs.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1300 tons, Arkansas river bridge, Jenks, Okla., for State Highway Department, to Tulsa Boiler & Machinery Co., Tulsa, Okla.

1000 tons, additional capacity, Legion field, Birmingham, Ala., to Virginia Bridge Co., Birmingham; Algernon Blair, Montgomery, Ala., general contractor.

525 tons, office and warehouse, Pillsbury Mills Inc., Springfield, Ill., to Hansel-Elcock Co., Chicago.

245 tons, Lamont Library, Harvard University, Cambridge, Mass., to Phoenix Bridge Co., Phoenixville, Pa.; George A. Fuller Co., Boston, general contractor.

205 tons, Supersonic laboratory, Massachusetts Institute of Technology, Cambridge, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, Electro-Metallurgical plant, Portland, Oreg., to Pacific Car & Foundry Co., Seattle.

120 tons, boiler house, Borden Co., Kankakee, Ill., to Hansell-Elcock Co., Chicago.

115 tons, addition, Mars Inc., Chicago, to Hansell-Elcock Co., Chicago.

110 tons, factory, Cherry River Paper Co., Bensenville, Ill., to Milwaukee Bridge Co., Milwaukee.

100 tons, building, International Equipment Co., Brighton district, Boston, to American Bridge Co., Pittsburgh.

Unstated, 30-ton cableway for Shasta dam spillway, to Washington Iron Works, Seattle.

Unstated, testing machine, 5 million pounds capacity, for Bureau of Reclamation, Denver, to Baldwin Locomotive Works, Eddystone, Pa., $406,341.

STRUCTURAL STEEL PENDING

3000 tons, building, Humble Oil & Refining Co., Houston, Tex.

1500 tons, addition to hospital, University of Illinois, Urbana, Ill.; bids Apr. 7.

1140 tons, Elsemere state bridge, Delaware, bids May 4.

685 tons, Willow road grade separation, Northfield, Ill., for Cook county; bids of Mar. 19 rejected.

500 tons, Du Pont laboratory, Philadelphia, new bids asked.

373 tons, vertical lift draw span, Maurice river, route 49, Millville, N. J.; bids May 1, Spencer Miller Jr., state highway commissioner, Trenton; also 40 tons, machinery; 33 tons, reinforcing bars, and 3150 square feet open grating steel flooring.

375 tons, Morris River state bridge, Millville, N. J., bids early in May.

350 tons, bridge approaches, Old Lyme, Conn.; Campanella & Cardi, Cranston, R. I., low.

267 tons, state bridge, Dubois, Pa., bids Apr. 28.

250 tons, bridges, Connecticut; deck plate girder, Vernon; two-span girder bridge, East Hartford, and welded deck girder, Old Saybrook; bids Apr. 21, Hartford.

125 tons, bridge, Manchester, Conn.; Alexander Jarvis, Manchester, Conn., low.

100 tons, four transmission towers, The Dalles, Oreg.; bids to Bonneville Power Administration, Portland, Oreg., Apr. 25.

Unstated, steel frame work for Pasco, Wash., pumping plant; bids to Bureau of Reclamation, Denver, Apr. 22.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1416 tons, Grand Coulee pumping station plant in Washington, by Bureau of Reclamation, to Sheffield Steel Corp., Kansas City, Mo.; $120,539.

1000 tons (previously reported 900 tons), medical center building, University of Washington, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; J. C. Boespflug Co., Seattle, general contractors.

680 tons, fermentation plant, Hamm Brewing Co., St. Paul, to Bethlehem Steel Co., Bethlehem, Pa.; William Baumeister Construction Co., St. Paul, contractor.

25 tons, engineering building, University of Washington, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; Sound Construction & Engineering Co., Seattle, general contractors.

REINFORCING BARS PENDING

8000 tons, various projects, Columbia Basin Irrigation Works; general contracts awarded.

1000 tons, Hippodrome building, St. Paul; bids Mar. 19, none received; project abandoned.

305 tons, state roadwork, Dubois, Pa., bids Apr. 25.

240 tons, Elsemere state bridge, Delaware, bids May 4.

125 tons, warehouse, Benner Tea Co., Burlington, Iowa; bids Mar. 24.

115 tons, highway bridge, New Milford, Winnebago county, Ill., for state; States Improvement Co., Chicago, low bidder; bids Mar. 28.

105 tons, conveyor manufacturing building, Goodman Mfg. Co., Chicago; bids Apr. 2.

100 tons plus, East 25th St. viaduct, Tacoma, Wash.; Anderson Bridge Construction Co. Tacoma, low $87,925.

PLATES . . .

PLATES PLACED

Unstated, 4400 feet of 30 and 14-inch steel water pipe for Crown-Zellerbach pulp mill, Camas, Wash., to American Pipe & Construction Co., Portland, Oreg.

PIPE . . .

CAST IRON PIPE PENDING

250 tons, 20,000 feet, 4 and 6-inch, class 150 bell and spigot, for King County district No. 7; bids to 8800 Victory Way, Seattle, Apr. 14.

100 tons plus, system project, Astoria, Oreg.; bids in.

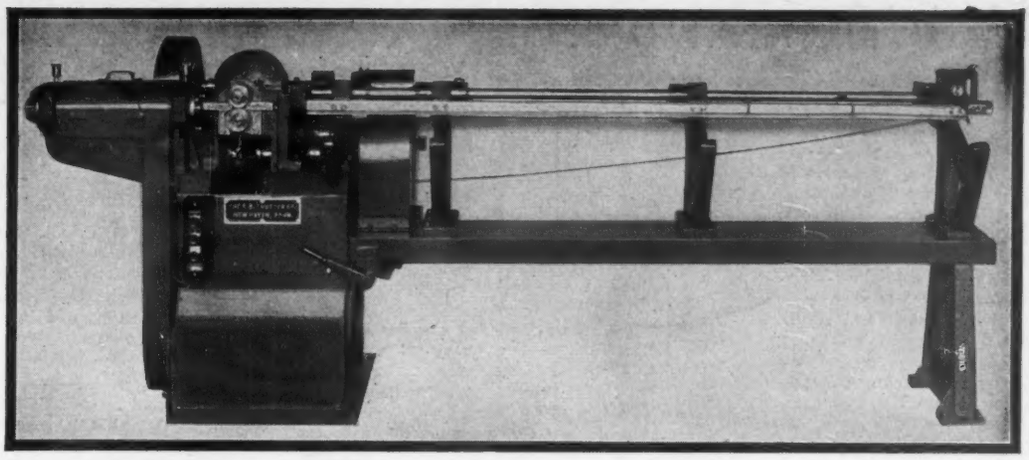
RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago, Milwaukee, St. Paul & Pacific, four 2000-horsepower diesel-electric locomotives, to Fairbanks, Morse & Co., Chicago.

Kansas City Southern, four 2000-horsepower diesel-electric locomotives, to Fairbanks, Morse & Co., Chicago.

TYPE 1A



CAP. 1/16 TO 3/16" DIA.

STRAIGHTENER SPECIALISTS FOR OVER 80 YEARS

Here are some of the refinements developed:

ALMOST CONTINUOUS WIRE TRAVEL—A LIGHTENING CUT-OFF THAT ASSURES SQUARE ENDS—A HIGH-SPEED, DIRECT-DRIVEN 5-DIE STRAIGHTENING FLIER—QUIET, EFFICIENT V-BELT MOTOR DRIVE—BALL & ROLLER BEARINGS THRUOUT—EXTREME RIGIDITY—TYPES FOR CAPACITIES FROM 1/32'' TO 11/16'' DIAMETER

Descriptive Folder Sent on Request

THE F. B. SHUSTER MFG. CO., 3106 MILL RIVER ST., NEW HAVEN, CONN.

SHUSTER *Automatic*

Since 1866

WIRE STRAIGHTENING AND CUTTING MACHINES

Magnesium Castings Are Available Now!

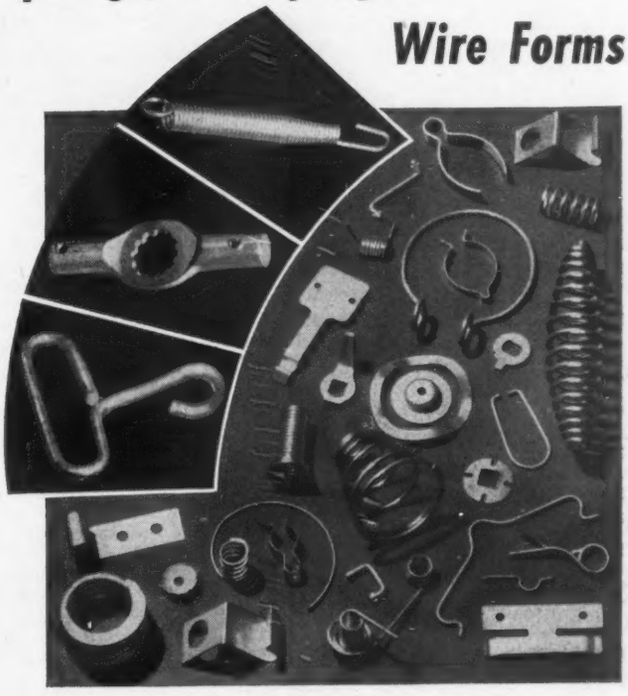
Often at Equal or Less Cost

Because of their excellent machining qualities, magnesium castings often cost less than finished castings of other metals. During the war, Utica Radiator made elaborate Magnesium castings for the Air Corps which met the most rigid requirements. Now we are making Magnesium alloy castings of all sizes, from a fraction of an inch up to six feet in diameter for a variety of uses, including aircraft, textile machines, office equipment, scales, fish line manufacturing, vacuum cleaners and toys. If you are having difficulties in getting deliveries of castings of other metals, why not investigate the possibilities of using Magnesium?

Write for complete information to

UTICA RADIATOR CORPORATION
Magnesium and Aluminum Castings
UTICA 2, N.Y.

Springs, Stampings Wire Forms



ESTABLISHED 1905
HUBBARD

M. D. HUBBARD SPRING CO.
SPRINGS · STAMPINGS · WIRE FORMS
WASHERS · COTTERS · EXPANSION PLUGS

425 CENTRAL AVE. **PONTIAC 12, MICH.**

CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—Virginia Bridge Co., H. W. Morgan, manager, has let contract to Dunn Construction Co. for work on new fabricating plant adjacent to present structure.

BIRMINGHAM—Reichold Chemicals Inc., Tuscaloosa, has announced a $5 million, five-year expansion program and will erect a chemical color and pigment plant immediately.

GADSDEN, ALA.—Republic Steel Corp. is planning construction of steel mill addition, to cost $200,000.

HARTFORD, ALA.—Wiregrass Electric Co-operative Inc. has awarded a contract of $545,169 to Montgomery Electric Co., Montgomery, for 581 miles of extension to its lines. Engineer is Lanier Engineering Co., Troy.

JEFFERSON, ALA.—Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, will build additional facilities to cost $946,000.

ARKANSAS

TEXARKANA, ARK. — Southwest Arkansas Electric Co-operative Corp. has REA funds of $365,000 for 257 miles of distribution lines

CONNECTICUT

WEST HAVEN, CONN.——Armstrong Rubber Co. Inc., 475 Elm St., plans a $300,000 laboratory. Architect is Fletcher & Thompson Inc., 211 State St., Bridgeport.

FLORIDA

DADE COUNTY, FLA.—Standard Oil Co. plans a $220,000 project which includes an office, warehouse and storage shed.

TALLAHASSEE, FLA.—State has let a $79,000 contract to Miller Electric Co., Jacksonville, for an underground electric distribution system at its capital center. Engineer is Maurice H. Connell & Associates, Miami.

INDIANA

RICHMOND, IND.—Perfect Circle Corp. will build an 80,000 sq ft plant to be completed by April, 1948.

IOWA

WAUKON, IA.—City has awarded contracts for improvements and equipment for municipal light and power plant totalling over $278,000, Largest contract went to Buckeye Machine Co., Lima, O., for two diesel engine generating units and auxiliaries.

KENTUCKY

LOUISVILLE, KY.—T. B. Miller & Sons Inc. has been formed by Howard L. Miller to develop coal mines and gas and oil properties. Capitalization is $100,000.

LOUISIANA

BATON ROUGE, LA.—Ethyl Corp. has awarded Stone & Webster, Boston, with $750,000 contract for a drumming plant.

BATON ROUGE, LA.—Sun Oil Co., Houston St., plans a $2,500,000 liquid hydrocarbon extraction plant in the Delhi field which will process 14,500,000 cu ft of gas daily.

MARYLAND

BALTIMORE—Baltimore & Ohio Railroad has let a $150,000 contract to Consolidated Engineering Co. Inc., 20 E. Franklin St., for storage facilities at Pier 3, Locust Point.

LAUREL, MD.—FCC has awarded a $68,920 contract to Joseph B. Bahen Construction Co., 6220 Third St., Washington, D. C., for a radio laboratory.

MICHIGAN

BATTLE CREEK, MICH.—Cardinal Mfg. Inc., 660 Capital Ave. S.W., has been formed by Raymond E. Meacham with a capital of $50,000 to manufacture and sell electric water heaters and appliances.

CERESCO, MICH.—Priest Machine & Plating Co., R.F.D. No. 1, has been formed by Raymond M. Priest with a capital of $50,000 as a machine shop and plating business.

CLIO, MICH.—Mid-State Foundry Co., Railway St., has been formed by Joseph Jacobson with a capital of $50,000 as a general foundry business.

DETROIT—Detroit Stamping Co. has awarded a $107,000 contract to Austin Co. for a factory addition.

DETROIT—Mick Mfg. Co., 1088 Bellevue Ave., has been formed by Normal W. Koeller with a capital of $500,000 to manufacture castings, tools and machinery.

DETROIT—Accord Tool & Machine Co., 26542 W. Eight-Mile Rd., has been formed by James C. Long Sr., with a capital of $100,000 to manufacture and sell tools, dies, jigs, gages and machinery.

HIGHLAND PARK, MICH. — Chrysler Corp. plans a manufacturing building here. Albert Kahn Associated Architects & Engineers are taking estimates.

LANSING, MICH.—Kold-Pak Inc., 733 Chicago Ave., has been formed by Harold E. Nickels with a capital of $75,000 to manufacture and repair refrigeration units and devices.

MARINE CITY, MICH.—Detroit Gasket & Mfg. Co. plans alterations and additions to its plant here which will cost $156,000. Architect is H. D. Ilgenfritz, Detroit.

MORENCI, MICH.—Park Rust Proof Co. has completed plans for a $175,000 factory addition.

OWOSSO, MICH. — Vernon Production Mfg. Inc., E. North St., has been formed by John Rolando with a capital of $50,000 to manufacture small steel precision parts and related products.

PONTIAC, MICH.—City will soon ask for bids for construction of two $1 million water storage tanks.

MISSISSIPPI

OXFORD, MISS.—City has voted a $450,000 bond issue for a municipal gas system. Bids will be received May 12.

MISSOURI

MOUND CITY, MO.—Mound City Tractor Co. has been incorporated by Harry J. Schreiber to manufacture, buy and sell tractors and other equipment.

ST. LOUIS — Mullinckrodt Chemical Works, 3600 N. Second St., has awarded a contract to Dickie Construction Co., Louderman Bldg., for additions to its plant.

ST. LOUIS—Thurmaduke Co., 2305 N. Broadway, has awarded a $100,000 contract to Murch-Jarvis Co. Inc., 718 Locust St., for erection of a 1-story, 177 x 181 ft building to replace the portion of its plant destroyed recently. C. W. Stiegmeyer, 452 S. Price Rd., is the architect.

ST. LOUIS—Union Electric Co. of Missouri, 315 N. 12th Blvd., has awarded a contract to Fruin-Colnon Contracting Co., 1706 Olive St., for the modernization of its Ashley St. steam power generating plant. The project will cost about $5 million including equipment.

NEW YORK

RENSSELAER, N. Y.—Winthrop Chemical Co. Inc., 22 Riverside Ave., will build a $2 million laboratory. Architect is W. Stuart Thompson, 250 Park Ave., New York.

BROOKLYN, N. Y.—Brooklyn Union Gas Co., 176 Remsen St., has awarded a $3 million contract to Koppers Co., Pittsburgh, for a 1-story, 254 x 379 ft structural steel gas storage facility.

NISKAYUNA, N. Y.—J. Gordon Trumbull Inc., architectural and engineering firm, 2630 Chester Ave., Cleveland, is preparing plans for a $25 million project for the U. S. Atomic Energy Commission which will be operated by General Electric Co., Schenectady, N. Y. Project will include laboratories for metallurgical and chemical research, a cyclotron and 3,500,000-volt electrostatic generators for atom smashing studies.

NORTH CAROLINA

CHARLOTTE, N. C.—R. C. Godfrey Plumbing & Heating Co. has been formed with a capital stock of $100,000.

CHARLOTTE, N. C.—Baskerville-Howell Co. has been incorporated by Ike C. Howell to engage in plumbing and heating business. Capital stock is $100,000.

OHIO

BARBERTON, O.—Babcock & Wilcox Co. will renovate its gray iron foundry here at a cost of over $500,000. Project includes remodeling plant and equipment additions.

BELLVILLE, O.—Bellville Foundries Inc. will install new equipment that includes abrasive machinery in a new building which was started recently.

CANTON, O.—Canton Smelting & Refining Co. will repair its building which suffered fire damages estimated at $100,000 recently.

OREGON

PORTLAND, OREG.—Electro Metallurgical Co. proposes to build a 20 x 120 ft warehouse costing $66,000.

PORTLAND OREG.—Portland General Electric Co. has announced an appropriation of $5,500,000 for system improvements including transmission lines, switches and remodeling of hydroelectric station.

PENNSYLVANIA

BROOMALL, PA.—Sun Oil Co., 1608 Walnut St., Philadelphia, plans a $205,000 physical research laboratory.

CREIGHTON, PA.—Pittsburgh Plate Glass Co. will build a $385,000 addition to its Duplate department here.

PHILADELPHIA — Philadelphia Electric Co., 1000 Chestnut St., will build a $108,000 transformer substation. Engineer is R. J. Milligan, c/o owner.

TEXAS

ATHENS, TEX. — New Era Electric Co-operative has let a contract for $77,970 to Reinheart & Donovan for rural electric lines. Engineers are Freese & Nichols, 407 Danciger Bldg., Fort Worth.

CORSICANA, TEX.—Magnolia Pipeline Co., Magnolia Bldg., Dallas, will build an electrically operated pumping station here to cost $450,000.

HOUSTON, TEX.—Sunray Oil Corp., Sun Oil Co., Shell Oil Co., Sinclair-Prairie Oil Co. and Magnolia Pipeline Co. will construct a $9 million natural gasoline plant and recycling facility in the See Ligson Field of Kelberg county.

HOUSTON, TEX.—American Smelting & Refining Co., Federated Metals Division, Clinton Rd., has plans nearing completion for construction of plant facilities to cost approximately $500,000. V. J. Cunningham will be plant manager.

TEXAS CITY, TEX.—Carbide & Carbon Chemicals Corp. has CPA approval for construction of water softening plant to cost $427,000.

VIRGINIA

NEWPORT NEWS, VA.—Chesapeake & Ohio Railway will construct a coal pier here costing $5 million, including supporting yard facilities.

CANADA

NIAGARA FALLS, ONT.—Canadian Carborundum Co. Ltd. will spend $500,000 on expansion including erection of bauxite ore storage building.

A FULL LOAD WITH EVERY PICK-UP

READY-POWER MAGNET CHARGERS

- Self-starting. Remote control at operator's hand insures fuel economy and provides greater convenience.
- Completely protected engines with engineered air cleaners, oil filters, fuel strainers.
- Engine parts or service available through International Harvester branch houses, Power Unit distributors, or farm tractor dealers, located everywhere.

Standard Magnet Chargers are rated from 7½ K.W. to 20 K.W.

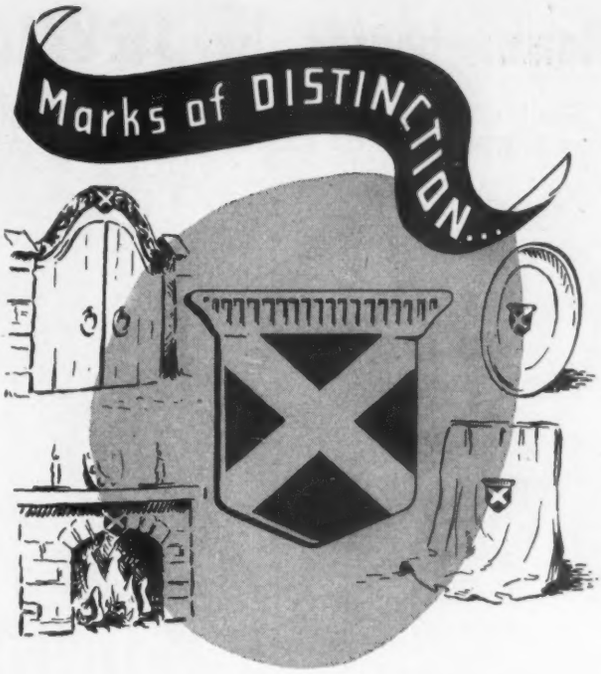
THE READY-POWER CO.

11230 Freud Ave. • Detroit 14, Mich., U.S.A.

Note to users of fine bearing metals:

the A.W. Cadman process, by ensuring perfect distribution of the hardening medium, greatly increases the life of the bearing, and removes the common cause of bearing trouble. For more information on bearing metals, consult with the Cadman people; we have been supplying bearing materials to industry since 1860, and we know most all the answers.

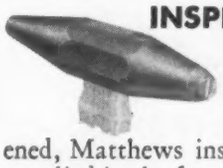
A.W. CADMAN MFG CO.
PITTSBURGH, PA.
ESTABLISHED 1860



Dating back to ages untold the coat of arms has served as the family identification for protection and distinction. This heraldry stands for a single unit set apart from others like it.

To set your product apart from others that are similar you need some distinctive marking—trademarks, product names, part numbers—every type of marking for your product to insure your own protection and to eliminate confusion.

INSPECTOR'S HAMMERS



Made from forged tool steel, properly tempered and hardened, Matthews inspectors' hammers can be supplied in the form you require . . . They are styled according to weights and application. Designed for safety and accuracy they can be furnished with marks engraved in the hammer head or with a device for quickly and easily changing the marking die. Write for Supplement A for complete information.

Jas. H. Matthews & Co., for nearly a century the COMPLETE marking house, offers a complete line of marking devices to answer your every marking need. Consult us, giving details and specifications, and we will suggest the marking device to best suit your purposes.

JAS. H. MATTHEWS & CO.

3978 FORBES STREET PITTSBURGH 13, PA.

BRANCH PLANTS
NEW YORK, BOSTON, CHICAGO, PHILADELPHIA, NEWARK, SYRACUSE

District Sales Offices: Cleveland Cincinnati, Birmingham, Dallas

Hammerboards by IRWIN

a product of experience

MORE FORGINGS per HAMMERBOARD DOLLAR!

Grade "A" Hammerboards
"Weldrock" Hammerboards
Release Pins
Boring Woods
Helves

IRWIN MANUFACTURING COMPANY, INC.
Garland, Pa.

JOHN H. SIPCHEN CO. 549 Washington Blvd. Chicago, Illinois
CHARLEDGE SALES 335 Curtis Building Detroit, Michigan
BRETT'S PATENT LIFTER CO., Ltd. Foleshill Works Coventry, England

STAMPINGS

CAPACITY AVAILABLE FOR STAMPED AND DRAWN PARTS. HIGH SPEED PRODUCTION. COMPLETE ENGINEERING SERVICE AND TOOL MAKING FACILITIES. DELIVERY SCHEDULES MET.

AMERICAN METAL WORKS, INC.
3003 N. Sixteenth Street
PHILADELPHIA 32, PA.

STAINLESS STEEL
—PERFORATED—
TO YOUR REQUIREMENTS
SEND US YOUR DWGS FOR PRICE

ALL SIZE AND SHAPE HOLES ALL METALS
ARCHITECTURAL GRILLES

SEND FOR CATALOG NO. 34

DIAMOND MFG. CO.
BOX 32 WYOMING, PA.

Certified Steel Abrasives
FOR USE IN BLAST CLEANING EQUIPMENT
SAMSON STEEL SHOT
ANGULAR STEEL GRIT
PITTSBURGH CRUSHED STEEL CO., PITTSBURGH, PA.
STEEL SHOT & GRIT CO., BOSTON, MASS.

GASOLINE - DIESEL
OHIO LOCOMOTIVE CRANES
STEAM - ELECTRIC
The OHIO LOCOMOTIVE CRANE Co. BUCYRUS OHIO

MEET THE BOYS *who buy*

and sell good used or surplus machinery You'll find them all in STEEL'S *"Used and Rebuilt Equipment" section, week after week. Your advertisement will reach them, too. Rates are very reasonable . . . . write today to*

★ ★ ★ ★

STEEL, *Penton Building, Cleveland 13, Ohio*

UNIT 357 Mobile Crane

- *It's Self-Propelled*
- *It Rides on Rubber*
- *It Has 1001 Uses!*

5 TON CAPACITY— 7 TON WITH OUTRIGGERS

UNIT 357 Clamshell unloading sand.

Fast, versatile industrial crane with plenty of LIFT ability . . . ideal for moving castings, steel, scrap, coal, lumber or even machine tools. Travels anywhere . . . on paved surfaces, cinders or just plain mud . . . gets there in a hurry. Available with crane hook, clamshell, or magnet . . . quickly convertible to any other attachment. *Operated by ONE man* . . . powered by ONE engine . . . controlled from ONE position in cab.

Features include: *Hydraulic steering . . . Air-actuated hydraulic brakes . . . One-piece cast gear case completely encloses and oil-seals all working parts. FULL VISION CAB,* pioneered by UNIT, provides 360° visibility for greater safety and efficiency.

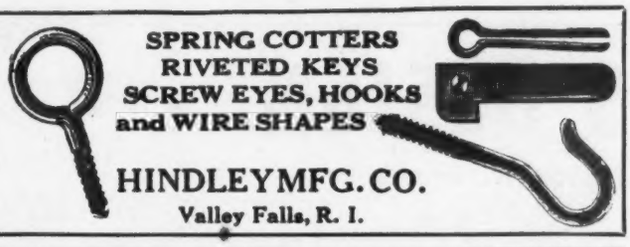
UNIT 357 Magnet used in loading scrap metal.

UNIT 357 Crane lifting bar stock.

CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY

UNIT CRANE & SHOVEL CORP. 6521 WEST BURNHAM STREET MILWAUKEE 14, WIS., U.S.A.

A 5073-½HA



SPRING COTTERS
RIVETED KEYS
SCREW EYES, HOOKS and WIRE SHAPES

HINDLEY MFG. CO.
Valley Falls, R. I.

DIFFERENTIAL
STEEL CAR CO., FINDLAY, OHIO

Air Dump Cars, Mine Cars, Locomotives, Lorries AXLESS Trains and Complete Haulage Systems

Pickling of Iron and Steel—*By Wallace G. Imhoff*
This book covers many phases of pickling room practice and construction and maintenance of pickling equipment.

Price Postpaid $5.00 — THE PENTON PUBLISHING CO. *Book Department* 1213 W. 3rd St., Cleveland 13, Ohio

520-S

Have It Galvanized by—
Joseph P. Cattie & Bros., Inc.
Gaul & Letterly Sts., Philadelphia, Pa.
Philadelphia's Oldest, The Country's Largest Hot Dip Job Galvanizer
Galvanized Products Furnished

Quality you can depend on!

SIMONDS GEARS

Any material—heavy types! Spur • Bevel • Mitre • Helical • Worm • Worm Gears • Racks—in cast or forged steel, gray iron, bronze, silent steel, rawhide or bakelite. Over 50 years' experience!

Also distributor for RAMSEY Silent Chain Drives and Couplings. Send us your inquiry today!

THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH
PITTSBURGH 22, PA.

Manufacturers OF SOLDERING, WELDING, BRAZING *and* GALVANIZING *Compounds*

Specializing since 1910, we have developed more than one hundred formulas for soldering, welding, and brazing.

Our research laboratories are at your disposal for any flux problems.

AMERICAN SOLDER & FLUX CO.
2153 E. NORRIS ST., PHILADELPHIA 25, PA.

RYERSON STEELS in Stock

Thousands of kinds, shapes and sizes of steel in stock at eleven plants. Call Ryerson first for prompt action on steel.

Joseph T. Ryerson & Son, Inc.
Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Boston, Buffalo, New York.

IRON · STEEL · ALLOY · ROUND · FLAT · SHAPES

WIRE

All sizes and finishes
ALSO WIRE SCREEN CLOTH
THE SENECA WIRE & MFG. CO.
FOSTORIA, OHIO

IRON STEEL WIRE "SENECA" STEELS QUALITY TRADE MARK

MECHANICAL TUBING
PRESSURE TUBING
STAINLESS TUBING

TUBULAR SERVICE

AIRCRAFT TUBING
SEAMLESS STEEL PIPE
STAINLESS STEEL PIPE

TUBULAR SERVICE CORPORATION

BELMONT IRON WORKS
PHILADELPHIA · NEW YORK · EDDYSTONE

Engineers - Contractors - Exporters
STRUCTURAL STEEL — BUILDINGS & BRIDGES
RIVETED — ARC WELDED
BELMONT INTERLOCKING CHANNEL FLOOR
Write for Catalogue
Main Office — Phila., Pa. New York Office — 44 Whitehall St.

SAVE MONEY
ON PRESSED STEEL PARTS!

If you want to save money on pressed steel parts, call on Budd's wide experience in steel stampings of all kinds.

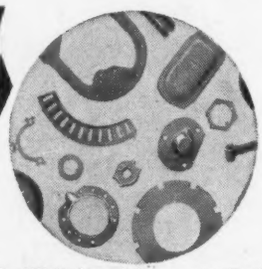
Like hundreds of manufacturers, you can take advantage of Budd "know-how" to lower production costs on blanks and stampings, in both regular grade and stainless steel. At your service Budd places the best-equipped machine shop—for both large and small dies—on the Atlantic seaboard.

Write today, sending a sample, blueprint or pencil sketch of your product, and let us quote you a price.

BUDD

THE BUDD COMPANY
Dept. 16 Philadelphia 32, Pa.

DEPENDABILITY
ACCURACY
ECONOMY



Since 1903, Whitehead has supplied American industry with stampings known for these qualities. Write for Catalog.

WHITEHEAD EST. 1903

WHITEHEAD STAMPING CO.
1667 W. LAFAYETTE BLVD., DETROIT 16, MICH.

★ ★ **ROLL PASS DESIGN** ★ ★

By Professor W. Trinks

These two volumes and Supplement comprise a complete digest of information on theory and practice of rolling mill design, construction and operation, etc., written by the leading authority.

VOLUME ONE — Third Edition; 201 pages; 7 tables; 139 drawings; @ $5.00 Postpaid
Contents: Classification and Strength of Rolls—Basic Principles Governing Entrance and Deformation—Various Principles Underlying the Process of Rolling

VOLUME TWO — Second Edition; 246 pages; 7 charts; 176 drawings; @ $6.00 Postpaid
Contents: Rolling of Square or Nearly Square Sections—Rolls for Flat Sections—Rolls for Merchant Bar—Rolling of Shapes—Die Rolling—Roll Mill Torque—Rolling of Nonferrous Metals—Roll Passes for Seamless Tubes

SUPPLEMENT — First Edition; 84 pages; 61 drawings; @ $1.50 Postpaid
New material, available since publication of Volumes One and Two, is included in this supplement. Reference is made to pages in the two volumes.

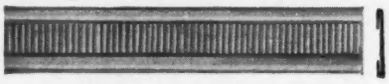
HAVE COPIES OF THESE BOOKS AVAILABLE WHEN YOU NEED THEM . . . *Order Today*

STEEL, BOOK DEPARTMENT
1213 W. 3RD ST., CLEVELAND 13, OHIO

(3% ADDITIONAL FOR ORDERS DELIVERED IN OHIO)

EQUIPMENT...MATERIALS

FOR SALE
55 TONS
Approximately 5,000,000 lineal feet.



¼" x .010 Galvanized Annealed Turned Edge Knurled Center Cold Rolled Strip Steel

This material is highly desirable for the export trade or for certain types of domestic manufacturing.

BRAINARD STEEL DIVISION
SHARON STEEL CORPORATION
Telephone - Warren 2114-1
Warren, Ohio

FOR SALE

COMPLETE 5-Stage BONDERIZER, used 240 hours; with 5 return type Spray Rooms and Connecting Tunnels. Opening 5' 0 x 5' 6 x 80' long. Automatic-motors 220/440. Heating by McKee Burmix Gas Burners plus auxiliary steam line pump, motor operated. Including 200 ft. 1/4-Ton Rivetless Chain Conveyor with Reeves Variable Speed Drive on 4" I-beam track; and vents and stack.

INFRA-RED OVEN, used 480 hours. 2-Section 18' long by 9' high with hinged top and bottom sections for complete enclosure 42" x 50" x 18' long. Complete with 180 ft. conveyor and Reeves drive. Light banks individually controlled. Reflecting surface of Stainless Steel. Complete with controls, feed lines in conduit.

This equipment installed new in 1945 for 25,000.00 Priced for quick sale and removal.

MARFORT COMPANY
4413 Train Ave., Cleveland 13
Phone Cleveland, Woodbine 5811

"FOR SALE"

50 tons 10" BP Beams 42#
50 tons 12" BP Beams 53#
33 tons 14" BP Beams 73#
59 tons 14" BP Beams 102#
The above items are in random lengths.
39 pcs. 6" Jr. Beams 4.4# 40'
149 pcs. 10" Jr. Beams 9# 40'
300 pcs. 10" Jr. Beams 9# 20'
64 pcs. 12" Jr. Beams 11.8# 40'
30 pcs. 12" Jr. Beams 11.8# 30'
142 pcs. 12" Jr. Beams 11.8# 60'
25 tons 10" WF Beams 21# 9 to 28'
20 tons 12" WF Beams 25# 9 to 30'
20 tons 12" WF Beams 27# 9 to 30'
25 tons 12" I Beams 50# 60'
25 tons 12" I Beams 40, 8# 60'
6 pcs. 13" Channel 50# 34'
50 tons 2x2x3/16" Angles 18to22'
50 tons 2x2x1/4" Angles 14to25'
50 pcs. 7x4x3/8" Angles 40'
122 pcs. 8x4x7/16" Angles 12to34'
10 pcs. 8x4x1/2" Angles 38'
85 pcs. 3/16x60x120" Floor Plates
100 pcs. ⅛x48x96" Floor Plates
12 tons 1/2x5" Flat Bars 16 to 22'
6 tons 7/16x4" Flat Bars 16 to 22'
350 ft. 5" Extra Heavy Steel Pipe 20 to 22' long.
400 ft. 6" Extra Heavy Steel Pipe 20 to 24' long.

KLINE IRON & METAL COMPANY
P. O. Box 1013
COLUMBIA, S. C.
Telephones 3670 & 4-1464

NEW
COPPER-NICKEL TUBES
½" O.D. .050 Wall 78" Long
At 25c per lb.
FIN-TUBE RADIATOR CO.
42-44 Wooster St. New Haven, Conn.

FOR SALE
1—26" Oil Centrifugal or Chip Wringer

(New). Removable Basket, Automatic Safety Cover, Vertical Motor Drive, Individual Control, Floor Mounting Type, 3 Horsepower, 1750 RPM, 220 Volts, 60 Cycle. Running Time 900 RPM Starts 15 per hour, Brake Time 30 seconds. Min. Run 2½ Minutes.

Also

2,649 lbs. CD STAINLESS STEEL, ⅝ Rd—Type 416.

Write Box 942,
STEEL, Penton Bldg., Cleveland 13, O.

MACHINERY FOR SALE

1—30"x12' Schumacher-Boye Engine Lathe, motorized drive change gear type, 5/3/60/220 GE motor.....$1200.00
1—4x60 Lo-swing hardened ways latest type 5/3/60/220 motor..... 500.00
1—24 Barnes Camel back 4-spindle drill, 20x96" table, single pulley drive 400.00
1—Norton 6x32 cylindrical grinder C.S. drive..... 400.00

ECONOMY PUMPS, INC.
Hamilton, Ohio Phone Hamilton 4400

STEEL FOR SALE

1" x 6" - 11' long 75,000 lbs.
20% - 5' long

Specifications:		
	Carbon	0.18%
	Manganese	0.43%
	Phosphorus	0.03%
	Sulphur	0.04%
	Silicon	0.07%

This is hot rolled steel, approximately 1020 S.A.E. Price is 2½c a lb., f.o.b. Columbus, Ohio.

Capitol Mfg. & Supply Co.
Box 1200 Columbus, Ohio

RAILS NEW AND RELAYING
TRACK ACCESSORIES
from **5** *Warehouses*
• PROMPT SHIPMENTS
• FABRICATING FACILITIES
• TRACKAGE SPECIALISTS
EVERYTHING FROM ONE SOURCE
L. B. FOSTER COMPANY
PITTSBURGH CHICAGO
NEW YORK SAN FRANCISCO

BORING MILLS, 24"-42"-52"-66"-72"-96".
GRINDER, Knife 10' Bridgeport, M.D.
GRINDER, Surface #16 Blanchard, 26" chuck.
HAMMERS, 4-B Nazel 5" x 5" M.D.
LATHE, Turret 24" Gisholt, 6¼" hole.
MILLERS, Plain Nos. 3 K&T and No. 4 Cin.
MILLERS, Vertical Nos. 3 & 4 Cin.
SHAPER, 36" Morton Draw Cut.
SLOTTER, 12" Putnam, 35" table, B.D.
STRAIGHTENER, Plate, 110" x 1¼", H&J.

WEST PENN MACHINERY COMPANY
1208 House Bldg. Pittsburgh 22, Pa.

FOR SALE
ALLOY STEEL
ROUND, HEX, SQUARE BARS
New York and Pittsburgh Warehouse Stocks
L. B. FOSTER CO.
9 Park Place, New York 7
Phone—Barclay 7-2111
P. O. Box 1647, Pittsburgh 30
Phone—Walnut 3300
Michigan Distributor
C. J. GLASGOW COMPANY
2009 Fenkell Ave., Detroit 3
Phone—Townsend 8-1172

3-4" ROTARY SHEAR
Quickwork Whiting Model No. 50A 3 Speed Transmission. Complete Motors & Controls.
Gotham Machinery Corp.
1775 Broadway New York 19, N. Y.
PLaza 9-4643

RELAYING RAIL
TRACK ACCESSORIES
MIDWEST STEEL CORP.
Gen'l Off. CHARLESTON 21, W. VA.
Warehouses
CHARLESTON, W. VA.
KNOXVILLE, TENN. • PORTSMOUTH, VA.

EQUIPMENT...MATERIALS

WANTED

Low Carbon, Mild Steel Bars

2 x 1 x 3/16 Channels—Any Quantity up to 300 Bars
3" @ 4.1# Channels—Any Quantity up to 100 Bars
2 x 1 x 3/16 Channels—Any Quantity up to 350 Bars
4" @ 5.4# Channels—Any Quantity up to 100 Bars
1 x 1 x 1/8 Tees—Any Quantity up to 400 Bars
1½ x 1½ x 3/16 Angles—Any Quantity up to 1000 Bars
1 x 1 x 1/8 Angles—Any Quantity up to 400 Bars
2 x 2 x 1/4 Angles—Any Quantity up to 500 Bars
1 x 1 x 1/4 Angles—Any Quantity up to 200 Bars
1¼ x 1¼ x 3/16 Angles—Any Quantity up to 100 Bars
3 x 2 x 1/4 Angles—Any Quantity up to 100 Bars
1½ x 1½ x 1/8 Angles—Any Quantity up to 100 Bars
2 x 2 x 3/16 Angles—Any Quantity up to 600 Bars

THE KIRK & BLUM MANUFACTURING CO.
Cincinnati 25, Ohio

FOR SALE

CARBON AND ALLOY STEEL BARS

4,000 lbs.	1-5/8" rd.	SAE 1045	14' R.L.
46,000 lbs.	2-5/8" rd.	C1040-1045	29'3-1/2" R.L.
8,000 lbs.	2-3/4" rd.	X-1335	3-1/2" cuts
760 lbs.	2-7/8" rd.	1045	14'-20'
100 lbs.	5/16" rd.	3245	12'
890 lbs.	5/8" rd.	NE9442	16'
5,000 lbs.	21/32" rd.	NE8630	24'-26'
13,000 lbs.	13/16" rd.	NE8740	26'8"
25,000 lbs.	7/8" rd.	NE9440	27'11"
1,000 lbs.	1" rd.	WD-3140	62"
10,000 lbs.	1-1/64" rd.	1345	27'11"
6,000 lbs.	1-1/32" rd.	NE9440	27'11"
500 lbs.	1-1/8" rd.	NE8630	18'-20'
12,000 lbs.	1-3/16" rd.	NE8630	18'
93,000 lbs.	1-5/16" rd.	WD4045	30'
1,200 lbs.	1-3/8" rd.	NE-8024	17'10"
1,600 lbs.	1-1/2" rd.	NE-8630	12'
3,500 lbs.	1-17/32" rd.	A-4142	6'
17,000 lbs.	1-5/8" rd.	5145	20'
800 lbs.	1-5/8" rd.	X-4130	13'-18'
2,000 lbs.	1-5/8" rd.	NE-8740	11'4"
1,500 lbs.	1-5/8" rd.	NE-8630	10'-12'
19,000 lbs.	1-3/4" rd.	NE-8620	22'
18,000 lbs.	1-27/32" rd.	NE-8650	16' R.L.
50,000 lbs.	2-3/32" rd.	NE-8650	12' R.L.
10,000 lbs.	3-3/4" rd.	NE-9435	40"-45"
4,700 lbs.	1-5/8" rd.	NE-8740	18'-20'
150,000 lbs.	1-11/16" rd.	NE-9445	30'
390,000 lbs.	1-5/8" rd.	NE-8640	29' 4-1/2" & shorts

LANSING DROP FORGE CO.
1024 South Logan St.
Lansing 2, Mich.
Phone 2-0868

Wanted!

RELAYING RAILS

all sizes and sections,
any tonnage, anywhere.

L. B. FOSTER CO.
Park-Murray Bldg., 11 Park Place, N. Y. 7, N. Y.
P. O. Box 1647, Pittsburgh 30, Pa.
1710 Continental Illinois Bank Bldg., Chicago 4, Ill.
315 Montgomery St., San Francisco 4, Calif.

Wanted—SHEARINGS

Any Amount—All Sizes, Galvanized, Cold and Hot Rolled Aluminum—Stainless and Copper. 6" Minimum Width to 36" Minimum Length. Uniform Quantities. Gauges from 16 to 30 Inclusive.

Write or Wire
Los Angeles Sheet Metal Mfg. Co.
901-903 E. 9th St. Los Angeles 21, Calif.
TRinity 4713

WANTED
COLD ROLLED

7-8 or 9 gauge, No. 1 Temper.
Must be 7¼" to 14¼" wide x 55" long.

Write, Wire or Phone
THE J. H. DAY COMPANY
1144 Harrison Ave. Cincinnati, Ohio

For Sale
Scrap Sheet Metal Baling Press

One Harris hydraulic baling press, Model 2-A-TG, complete with Hydraulic Power Unit, and 75 H.P., 220 Volt, 3 Phase, 60 Cycle, 1200 R.P.M. Squirrel Cage Motor. The Charging Box dimensions are, 96" long, 60" wide, and 14" high, to compress bales 14" x 14" x 22", weighing an average of 250 pounds. Immediate delivery.

Andrew J. Naporano
102 Malvern St. Newark 5, N. J.

Wanted
1—PLATE BENDING ROLL

Pyramid or Initial Type
1/2" x 8'

CHICAGO STEEL TANK CO.
6400 W. 66th St. Chicago 30, Ill.

UNUSUAL BARGAIN

One 40 lb. Bradley Helve Hammer
One 80 lb. Bradley Helve Hammer
One 200 lb. Bradley Helve Hammer
f. o. b. Weedsport, N. Y.
Surplus Department
PHOENIX TOOL COMPANY
Weedsport, N. Y.

URGENTLY NEEDED
MILD STEEL SHEET OR PLATE

SAE 1010 Hot or Cold Rolled Standard Mill Size Sheets or Plates in 9/64"-3/16"-¼" or 5/16" Thickness.

Write, Wire or Phone
Sizes and Quantity Available
THE BROWN-BROCKMEYER COMPANY
Dayton, (1), Ohio.
Mfgrs. Electric Motors and Grinders.

FOR SALE
2 — Hydraulic Riveting Machines

Watson-Stillman, 48" Throat,
1½" Daylight.

Address Box 733,
STEEL, Penton Bldg., Cleveland 13, O.

STEEL BUILDING

180' x 200'—45' high No siding, but 12 ga. flat sheet steel roof. Located: Wisconsin.

IRON & STEEL PRODUCTS, INC.
13462 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

WANTED
AJAX #0 FORGING ROLL
With Side Shear

MID-WEST FORGING & MFG. CO.
38 S. Dearborn St. Chicago 3, Ill.
Randolph 3242

ROLLING MILLS *and* EQUIPMENT

FRANK B. FOSTER
829 OLIVER BLDG. PITTSBURGH, PA.
Cable Address: FOSTER, Pittsburgh

ANNEALING FURNACE

One Lee Wilson annealing furnace. Bell type with 3 annealing bases and retorts, one furnace bell and complete automatic temperature control. This equipment is practically new.

Call John England
Carey-McFall Co. Montoursville, Pa.
Tel: Williamsport 8666

CLASSIFIED

Positions Wanted

EXECUTIVE—MANUFACTURING
BROAD BACKGROUND IN SHEET METAL AND STEEL FABRICATION, MACHINING, DIVERSIFIED ASSEMBLY, VARIETY OF FINISHES. EXPONENT OF SIMPLIFIED CONTROL PROCEDURE—MATERIALS, INCENTIVE, PLANNING, SCHEDULING, COST COLLECTION. EXPERIENCED IN TOOLING AND METHODS FOR BOTH JOBBING AND MASS PRODUCTION. FORMER MEMBER WESTINGHOUSE FORMS COMMITTEE. WRITE BOX 947, STEEL, PENTON BLDG., CLEVELAND 13, O.

INDUSTRIAL ENGINEER - JUNIOR EXECUTIVE. Rensselaer Polytechnic Institute Graduate, Bachelor of Science in Mechanical and Industrial Engineering. Trained in large corporations since 1938 in Industrial Engineering, Design, Research and some Sales Engineering. Wear well with people and have learned to grasp governing factors of problems. Willing to invest up to $10,000 in any going business. Write Box 941, STEEL, Penton Bldg., Cleveland 13, O.

PLANT MANAGER, EXTENSIVE BACKground in technical and practical experience. Chief engineer, design special machinery hydraulic and mechanical. High production planning, actual shop experience tool making, welding, machine shop, forge shop, metal stamping, organize production lines. Write Box 937, STEEL, Penton Bldg., Cleveland 13, O.

WORKS MANAGER OR ASST.—AGE 37— Diversified experience in management, engineering and manufacturing. Seasoned in Welding Engineering, Tool Engineering, Material Planning and Scheduling, Industrial Engineering, Factory Cost and Personnel, etc. Capacity for analyzing bottlenecks and assuming leadership. Address Box 940, STEEL, Penton Bldg., Cleveland 13, O.

EXPERIENCED TUBE MILL SUPERVISOR will take complete charge of teaching; and operating tube mills. All size tubes; inside flash removed; deformed tubes. Experienced on Yoder and privately owned tube mills, also roll forming machinery. Address Box 926, STEEL, Penton Bldg., Cleveland 13, O.

STEEL EXPEDITOR OR PURCHASING AGENT. Age 41. 20 years exp. production, metallurgical, inspection, U. S. Steel, J & L, Great Lakes, Wheeling, Armco. 9 years supervisory position. Address Box 948, STEEL, Penton Bldg., Cleveland 13, O.

PRODUCTION MANAGER, EXPERIENCED IN all phases of production control. Will guarantee 10-15 per cent savings. Investigate this guarantee. Address Box 921, STEEL, Penton Bldg., Cleveland 13, O.

FORGE SHOP SUPERINTENDENT. 20 YEARS' experience in high production and die design on board and steam hammers, upsetters, etc., M. E. Write Box 936, STEEL, Penton Bldg., Cleveland 13, O.

GENERAL MANAGER AVAILABLE FOR FORGing company. Experienced in costs, die work, machining and labor management. Write Box 938, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 37 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, Inc., 110 Dun Bldg., Buffalo 2, N. Y.

SALARIED PERSONNEL $3,000 — $25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. JIRA THAYER JENNINGS, Dept. S, 109 Church St., New Haven, Conn.

Help Wanted

SALES PROMOTION

Aggressive technical graduate under 30 interested in promotional and industrial sales. No experience required. Permanent position with long established corporation located in Cleveland. State age, education, qualifications and salary expected.

Address Box 944,
STEEL, Penton Bldg., Cleveland 13, O.

GRADUATE ENGINEER
Wanted immediately—Manufacturing Corporation desires graduate engineer. Age 30-40. Experienced gasoline engine and farm machinery design. Salary commensurate with ability. Good character and experience references a must. For interview call or write Mr. Bemis, Engineering Dept., Jaques Power Saw Company, Box 695, Denison, Texas, Phone 736.

TOOL STEEL SALESMEN REQUIRED BY reputable New York Distributor with extensive stocks of cold work steels, one for each of the Philadelphia, Hartford, Connecticut and Boston, Massachusetts districts. Replies with details of experience, age, etc., treated confidentially, to Box 930, STEEL, Penton Bldg., Cleveland 13, O.

Accounts Wanted

MANUFACTURERS REPRESENTATIVE IN Northern Ohio wants additional account in material handling field, such as conveyors, monorail, factory trucks, racks, industrial furnaces, ovens, or infra red equipment. Well known throughout territory as result of 20 years selling. Write Box 943, STEEL, Penton Bldg., Cleveland 13, O.

MANUFACTURERS' REPRESENTATIVE, Cleveland and Northern Ohio, for gears and speed reducers and allied transmission equipment. Write Box 946, STEEL, Penton Bldg., Cleveland 13, O.

Representatives Wanted

MANUFACTURERS REPRESENTATIVE—MINNEAPOLIS AND ST. PAUL AND PITTSBURGH TERRITORIES BY ONE OF THE OLDEST AND LARGEST BROACHING TOOL MANUFACTURERS. PREFER MEN WITH ESTABLISHED CONTACTS, NOW COVERING THESE TERRITORIES, AND HANDLING OTHER CUTTING TOOL OR ALLIED LINES. REPLIES WILL BE CONSIDERED CONFIDENTIAL. ADDRESS BOX 933, STEEL, PENTON BLDG., CLEVELAND 13, O.

Opportunities

WANTED

SHEET METAL FABRICATING CO.

who is interested in getting into a proven sound business. Must be equipped with power brake, power shear, spot welders, approx. 12,000 sq. ft. space necessary. This is not just an ordinary offer.

Write Box 939,
STEEL, Penton Bldg.,
Cleveland 13, O.

SUPPLIER OF IRON AND STEEL FOR EXPORT

Important Swedish importer of hot-rolled and cold-rolled iron and steel wants to establish contact with manufacturer or exporter, fully equipped to execute orders promptly, for delivery to the Scandinavian countries. Offers with complete technical information to AB C. I. Pihl, Kungsgatan 10, Gothenburg, Sweden.

Cable address "FERROPIHL".

Professional Services

THE F. A. SCHNEIDER CO.

Consulting Engineers

Manufacturing Buildings, Process Plants and Related Building Structures, Designs, Layouts and Details.

118 E. Southern Ave. Bucyrus, Ohio

SPECIAL MANUFACTURERS TO INDUSTRY... *Since 1905*

Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials

WRITE FOR FOLDER
LARGE SCALE PRODUCTION
OR PARTS AND DEVELOPMENT ONLY

GERDING BROS.
SE THIRD VINE ST. ● CINCINNATI 2, OHIO

COMMERCIAL BRAZING

Copper Brazing	Hydrogen Brazing
Silver Soldering	Bright Annealing
Induction Brazing	Induction Heating

FOUR ULTRA MODERN TECHNICALLY CONTROLLED PLANTS IN:

Chicago, Ill.—Long Island City, N. Y.
Cleveland, Ohio—Valparaiso, Ind.

Please address inquiries to Exec. Offices

SALKOVER METAL PROCESSING
321 Dixie Terminal Cincinnati 2, Ohio

ADVERTISING INDEX

A

Air Reduction 164
Alan Wood Steel Co. 139
Allis-Chalmers Mfg. Co. 10, 11
Aluminum Company of America, Chemicals Division 48
American Brake Shoe Co., National Bearing Division 45
American Brass Co., The 33, 34
American Cable Division, American Chain & Cable 135
American Chain & Cable, American Cable Division 135
American Chain & Cable, Page Steel & Wire Division 165
American Electroplaters' Society 36
American Metal Works, Inc. 178
American Pulley Co., The 14
American Pulverizer Co. 169
American Rolling Mill Co., The 81
American Solder & Flux Co. 179
American Wheelabrator & Equipment Corp. 127
Armstrong-Blum Mfg. Co. 173
"Automatic" Sprinkler Corporation of America 140

B

Belmont Iron Works 180
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 143
Bixby, R. W., Inc. 183
Blaw-Knox Co., Pittsburgh Rolls Division .. 141
Bliss, E. W., Co. 83
Boston Woven Hose & Rubber Co. 29
Brooks Oil Co., The 106, 107
Bryant Chucking Grinder Co. 67
Budd Co., The 180
Bundy Tubing Co. 103

C

Cadman, A. W. Mfg. Co. 177
Canedy-Otto Mfg. Co. 8
Carpenter Steel Co., The 97
Cattie, Joseph P., & Bros., Inc. 179
Cincinnati Shaper Co., The 2
Cities Service Oil Co. 42
Cleveland Crane & Engineering Co., The .. 6, 7
Cleveland Quarries Co., The 144
Cleveland Tramrail Division of The Cleveland Crane & Engineering Co. 6, 7
Cold Metal Products Co., The 101
Continental Screw Co. 136

D

Dempster Brothers, Inc. 173
Detroit Power Screwdriver Co. 162
Detroit Steel Corporation, Reliance Steel Division 52
Dewey & Almy Chemical Co. 168
Diamond Mfg. Co. 178
Differential Steel Car Co. 179

E

Eaton Manufacturing Co., Foundry Division 31
Elastic Stop Nut Corp. of America 3
Electric Controller & Mfg. Co., The ..... Inside Front Cover
Electric Furnace Co., The 16
Electro Refractories & Alloys Corp. 129

F

Farval Corporation, The .... Inside Back Cover
Foster, Frank B. 182
Foster, L. B., Co. 181, 182
Fuller Brush Co., The 166

G

General Electric Co. 25
General Steel Warehouse Co., Inc. 122
Geometric Tool Co. The 115
Gerding Bros. 183
Gerrard, A. J., & Co. 171
Gibson, William D., Co., The, Division of Associated Spring Corporation 28
Gisholt Machine Co. 15
Great Lakes Steel Corp. 72
Greenfield Tap & Die Corporation 115
Gulf Oil Corporation 37
Gulf Refining Co. 37

H

Hanlon-Gregory Galvanizing Co. 146
Hansen Manufacturing Co., The 21
Hanson-Van Winkle-Munning Co. 46
Hindley Mfg. Co. 179
Holliday, W. J., & Co., Inc. 20
Horsburgh & Scott Co., The 132
Hubbard, M. D., Spring Co. 175

I

Industrial Brownhoist Corp. 47
Industrial Finishing Exposition 36
Inland Steel Co. 55
International Graphite & Electrode Corp. ... 138
International Nickel Co., Inc., The 56
Irwin Manufacturing Co., Inc. 178

J

Jeffrey Manufacturing Co., The 24
Jira Thayer Jennings 183

K

Kearney & Trecker Corporation 9
Kline Iron & Metal Co. 181

L

Lake City Malleable Co., The .... Back Cover
Logemann Brothers Co. 161

Mc

McGill Manufacturing Co., Inc. 134
McKay Machine Co. The 145

M

Matthews, Jas. H., & Co. 177
Michigan Tool Co. 99
Midwest Steel Corp. 181
Minnesota Mining & Mfg. Co. 17
Molybdenum Corporation of America 131

N

National Bearing Division, American Brake Shoe Co. 45
National Steel Corporation 72
Norton Co. 18, 19

O

Ohio Crankshaft Co., The 137
Ohio Ferro-Alloys Corporation 104
Ohio Locomotive Crane Co., The 178

P

Page Steel & Wire Division, American Chain & Cable 165
Parker Rust Proof Co. 38
Peninsular Grinding Wheel Co., The ... 124, 125
Pittsburgh Crushed Steel Co. 178
Pittsburgh Lectromelt Furnace Corp. 111
Pittsburgh Plate Glass Co., Brush Division .. 112
Pittsburgh Rolls Division of Blaw-Knox Co. 141
Preformed Wire Rope Information Bureau .. 135

R

Ransome Machinery Co. 170
Reading Chain & Block Corp. 174
Ready-Power Co., The 177
Reliance Steel Division, Detroit Steel Corp. 52
Republic Steel Corporation 43
Ryerson, Joseph T., & Son, Inc. 180

S

Salkover Metal Processing 183
Schneider, F. A., Co. 183
Seaver, Jay J., Engineers 167
Seneca Wire & Mfg. Co., The 180
Sheffield Corporation, The 50
Shenango-Penn Mold Co. 116
Shuster, F. B., Mfg. Co., The 175
Simonds Gear & Mfg. Co., The 179
Sinclair Refining Co. 23
Socony-Vacuum Oil Co., Inc. 30
South Bend Lathe Works 119
Standard Conveyor Co. 142
Strom Steel Ball Co. 171
Superdraulic Corporation 75
Superior Steel Corporation 133

T

Taylor-Winfield Corporation, The 39
Thew Shovel Co., The 35
Timken Roller Bearing Co., The ..... Front Cover
Tubular Service Corporation 180

U

Union Pacific Railroad 44
Unit Crane & Shovel Corp. 179
United States Graphite Co., The 12, 13
Upton Electric Furnace Div. 32
U. S. Automatic Corporation 172
Utica Radiator Corporation 175

V

Veeder-Root, Inc. 117

W

Washington Steel Corporation 163
Wean Engineering Co., Inc. 27
Wellman Engineering Co., The 5
Wells Manufacturing Corporation 26
Westinghouse Electric Corporation 40
West Penn Machinery Co. 181
Whitehead Stamping Co. 180
Wilson Welder & Metals Co., Inc. 49
Wyckoff Steel Co. 121

Y

Yoder Co., The 22
Youngstown Sheet & Tube Co., The 41

~ ~ ~

Table of Contents, Page 51

Classified Advertising, Pages 181, 182, 183

$250,000 more output with Farval

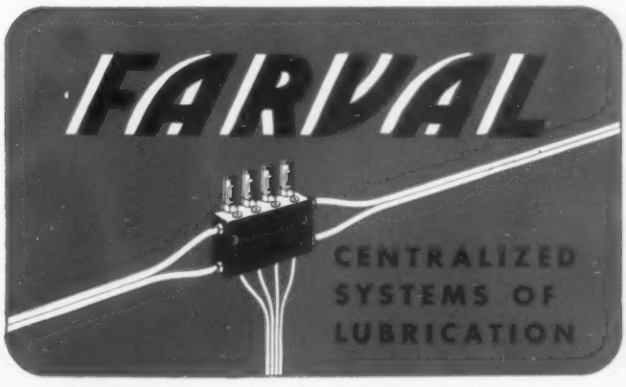
FARVAL—*Studies in Centralized Lubrication No. 88*

IN the tire and tube department of a rubber company, it was necessary to shut down the vulcanizers to lubricate them by hand. A study by the Methods Department showed that the production lost during this shutdown time was equivalent to the full output every day of five vulcanizers. Measured in tires and tubes not produced, the indicated annual loss was well over 50,000 units. Additional vulcanizers to make up this loss would have cost more than $45,000.

The company turned to Farval Centralized Lubrication, for with Farval it is not necessary to stop machines to lubricate them. By eliminating the need for additional vulcanizers and through savings in labor and lubricant, the Farval installation would pay for itself in less than 10 months. And the value of the tires and tubes to be produced in the time saved is well above a quarter million dollars.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, while a machine is in operation. Farval is the Dualine System with the Positive Piston Displacement Valve. This valve has but two moving parts and is fully adjustable, with a Tell-tale indicator at each bearing to show the job is done. For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



"SHOCK PROOF"
Malleable Castings

. . . faster machining

The Lake City Malleable Co.
Cleveland 14, Ohio